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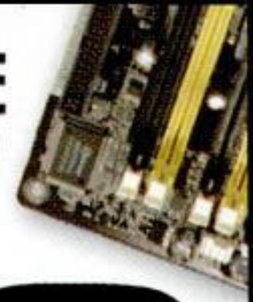

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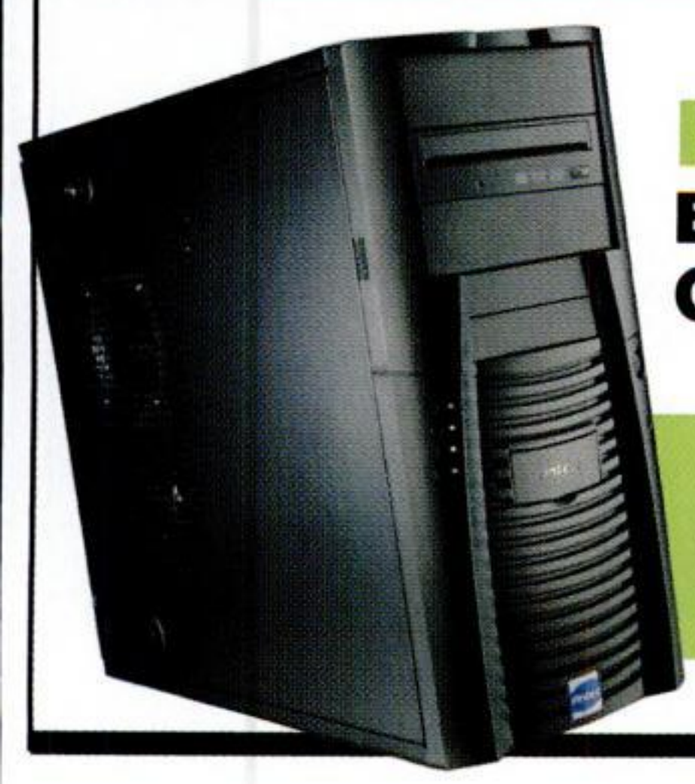

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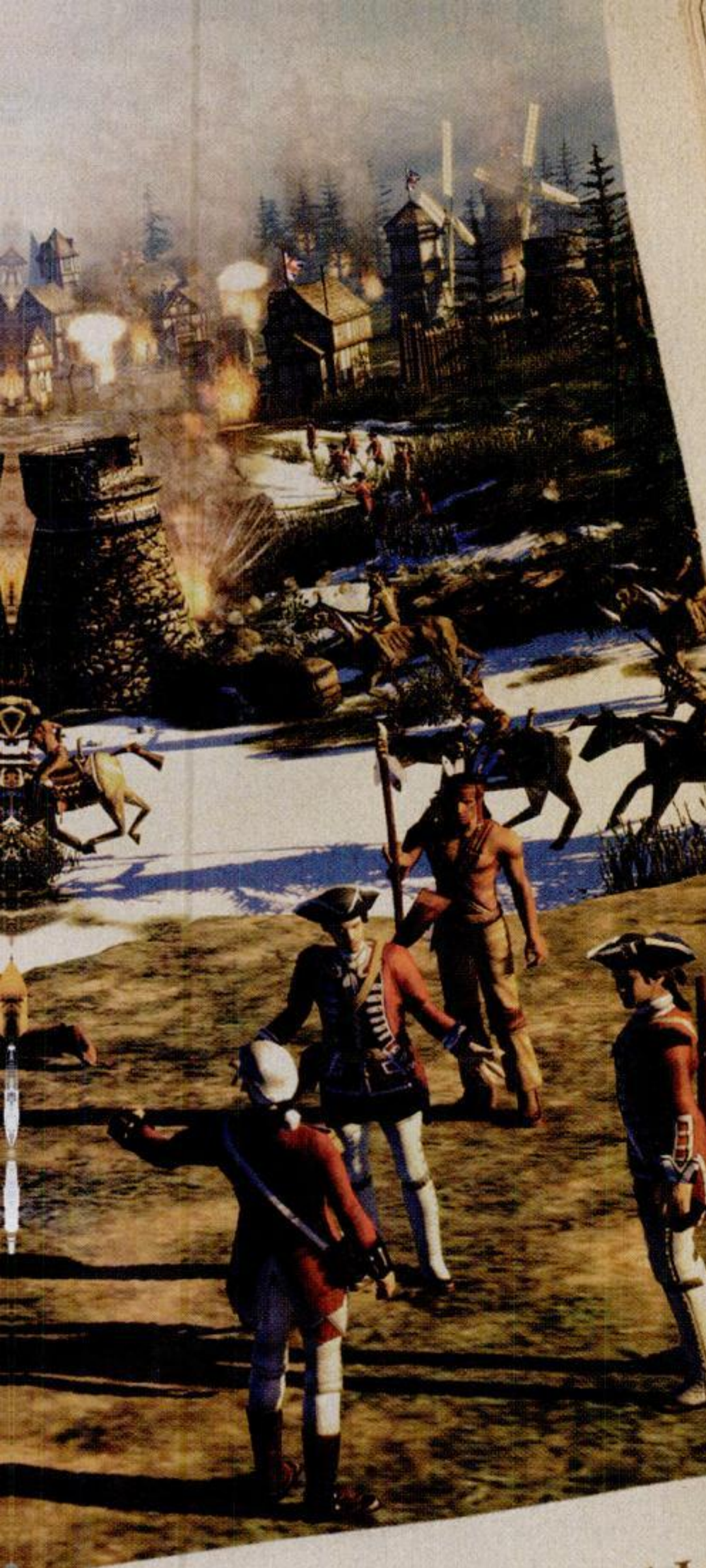

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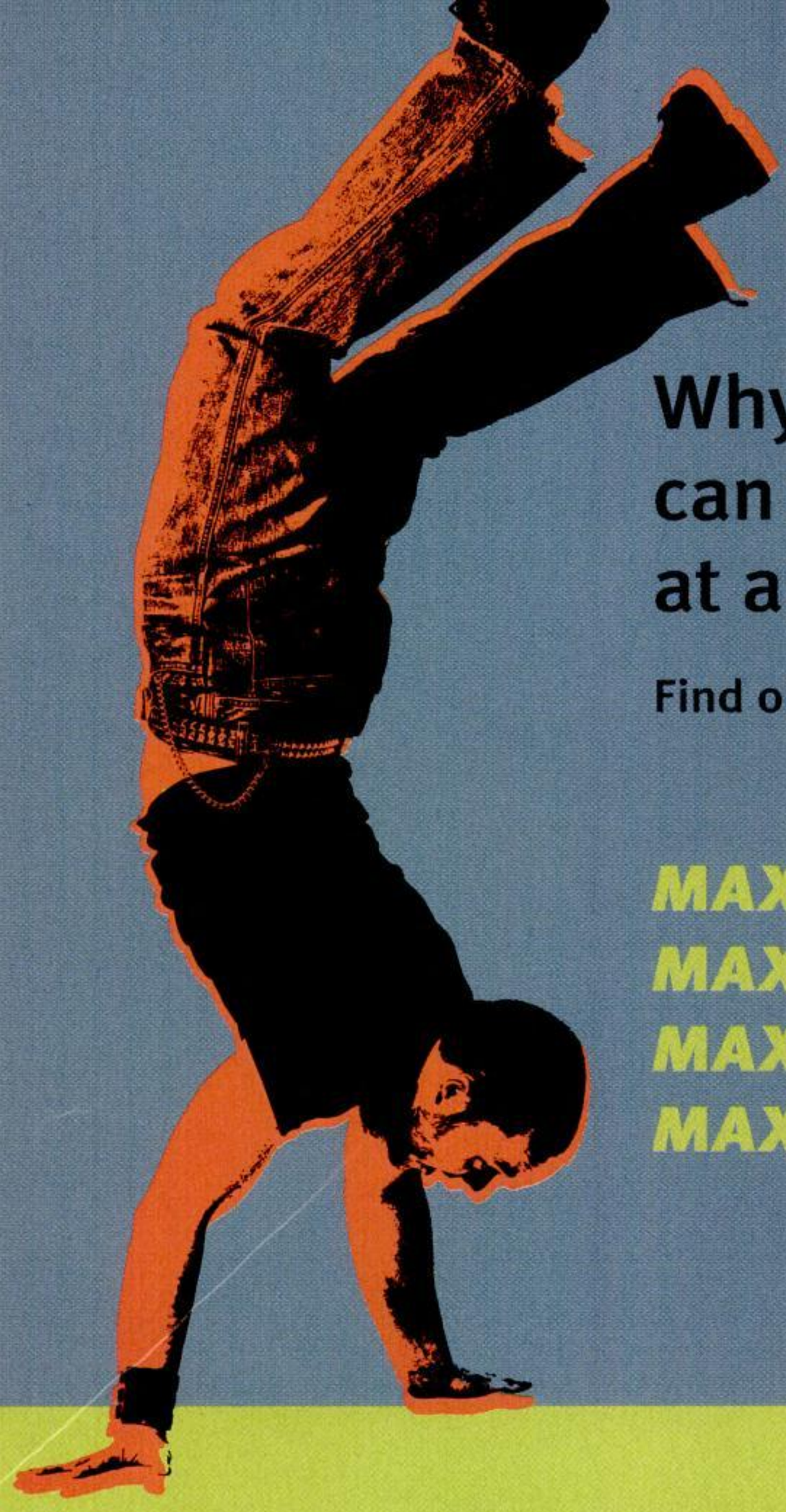

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Fix Windows Now!

When I reviewed Windows XP, way back in October 2001, I declared it the best Windows yet, awarding it a perfect score of 10 and the coveted Kick Ass award. Oh how times have changed!

After four short years, the sparkling luxury sedan of an operating system that was Windows past has been replaced by an unserviceable hulk of an OS that's one bad app away from a parking spot on cinderblocks behind KFC. Windows is in sad shape, and it needs a lot more than a Service Pack and a few nag screens to fix the problem.

Windows users have lost control of their computers. Whatever you call it, the situation with spyware, viruses, worms, and Trojans is destroying users' confidence in their computers. When unexpected things happen—and believe me, they do—victims just assume that's the way things have to be. You shouldn't have to live with pop-ups, an ever-changing home page, painful slowdowns, or any of the other nasty side-effects of computing today.

This isn't a problem that affects only grandparents and technophobes. *Maximum PC* editors have had spyware infestations on their machines. Virus and worm outbreaks plague *everyone*, whether they cause lost downtime, destroy your data, or just create a deluge of spam hawking mortgages and generic Viagra. Sure, Microsoft is making some sweeping changes in Windows Vista that should help, right?

Not really. The fixes in Vista won't do anything to help the hundreds of millions of people using Windows XP right now. Service Pack 2's Firewall and Security Center helped slow the unchecked spread of viruses and worms, but the spyware problem is worse than ever. Why in the hell should Microsoft expect users to pay to upgrade to Windows Vista when Windows XP has caused them nothing but trouble? Why should I shell out my hard-earned dollars to get a fix for the underlying flaws in its OS?

Before I'm going to recommend that anyone spend money on Windows Vista, I want to see fixes to Windows XP. Show me you can make XP work, protect it from evil-doing applications that install 16 other even-worse applications that send my credit card information to Russian hackers. Give me a solution that helps me right now and I'll think about upgrading to Vista at the end of next year.

I'm still really excited about Vista. I have high hopes that Microsoft will deliver an innovative new operating system that takes full advantage of the resources modern hardware has to offer, and that will protect my machine. But I want to see Windows XP fixed first.

Will Smith

Please send feedback and pie to ***will@maximumpc.com.***

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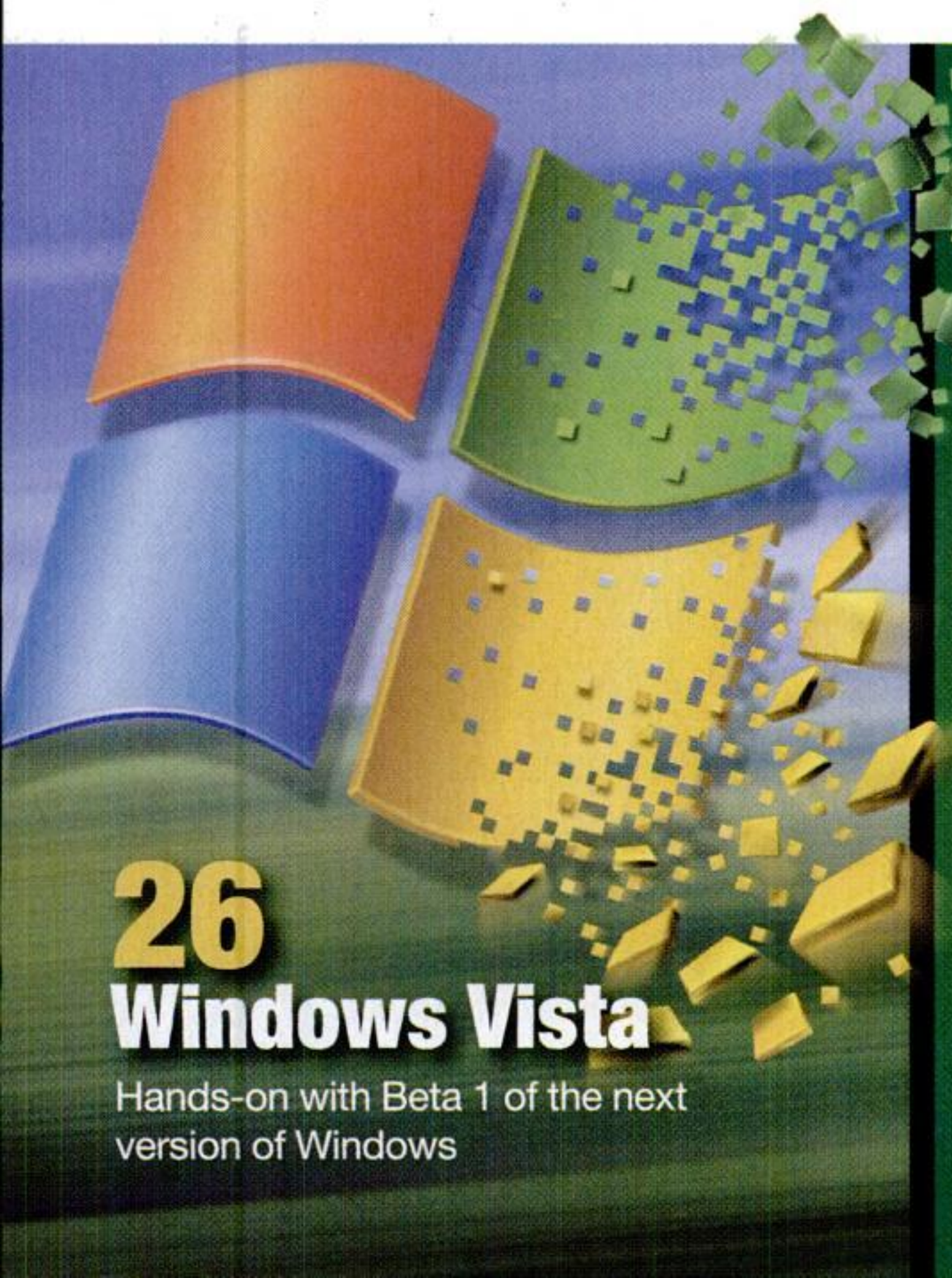

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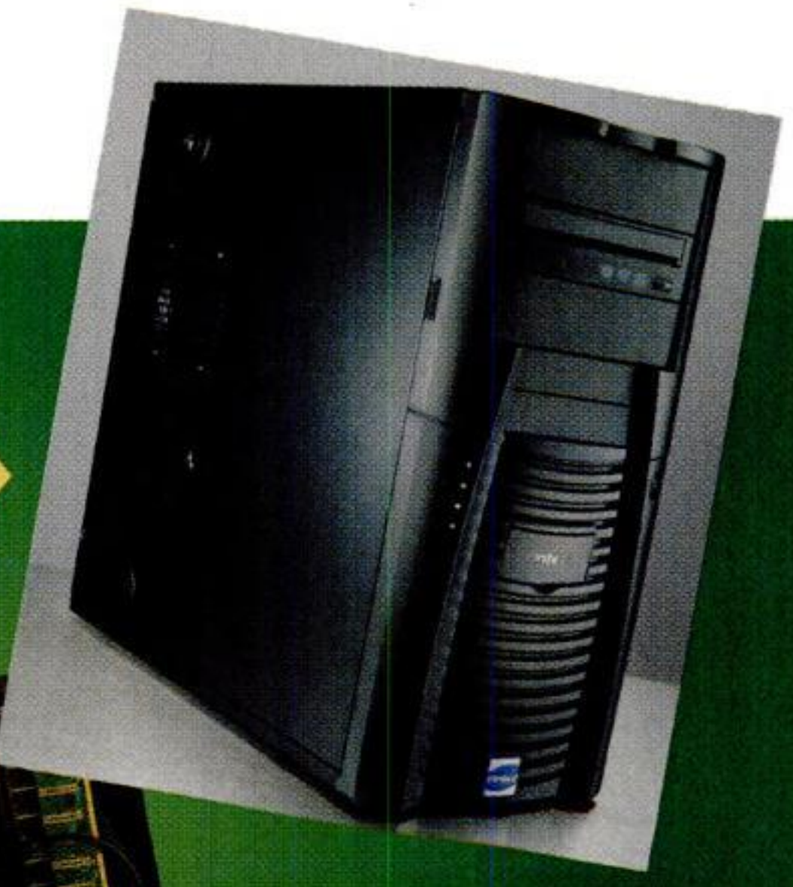

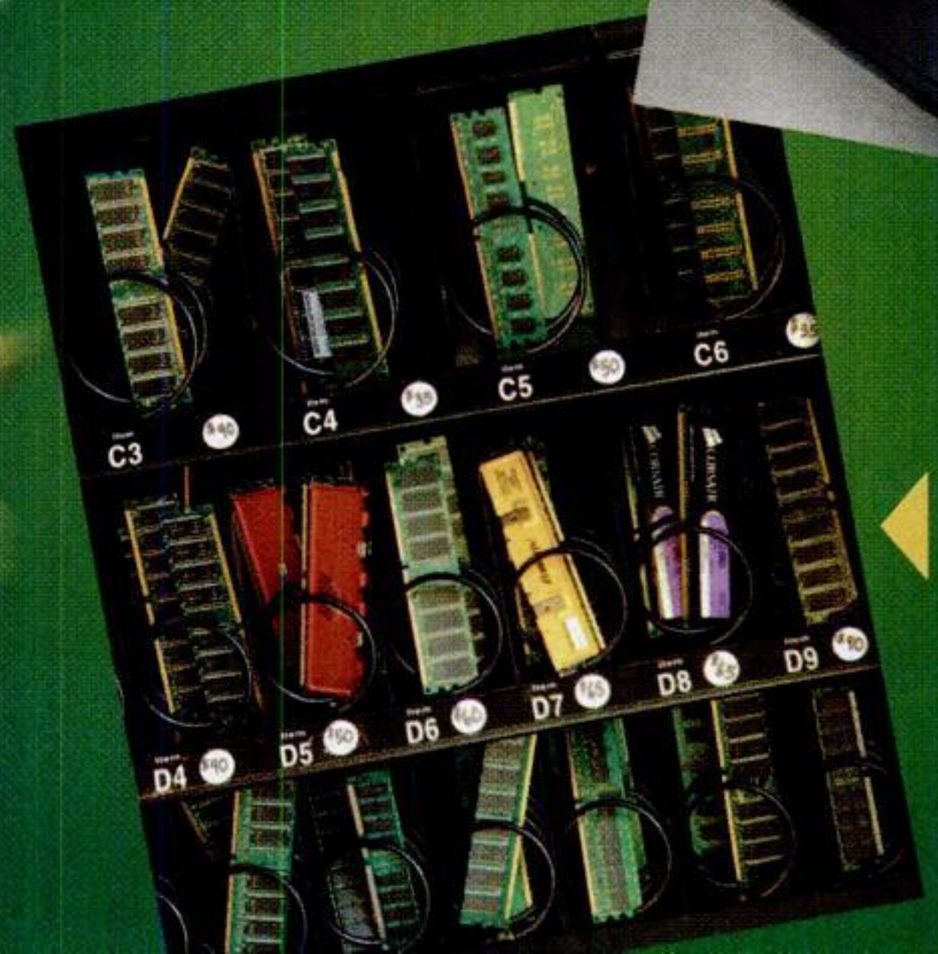

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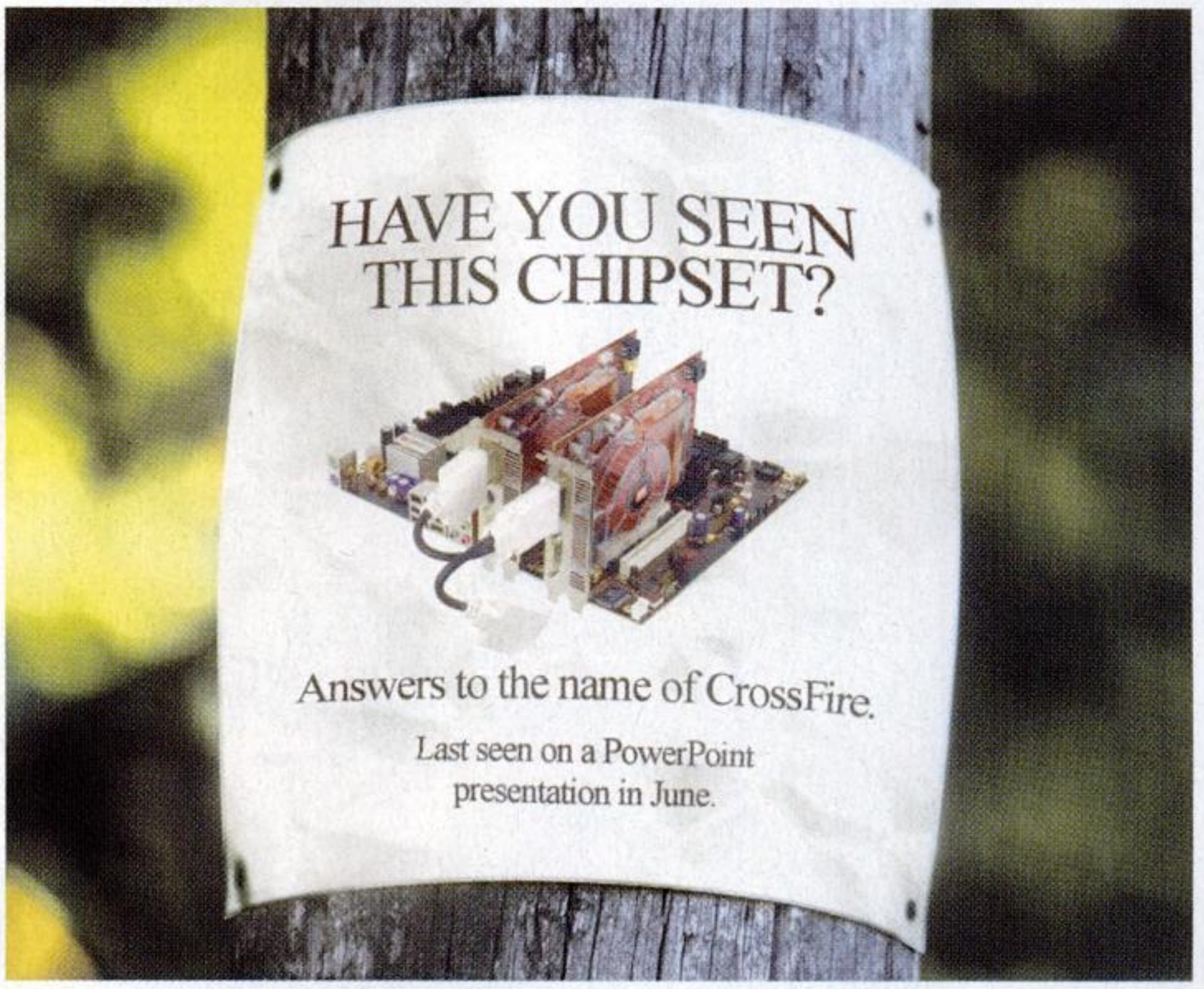
What's up with ATI?

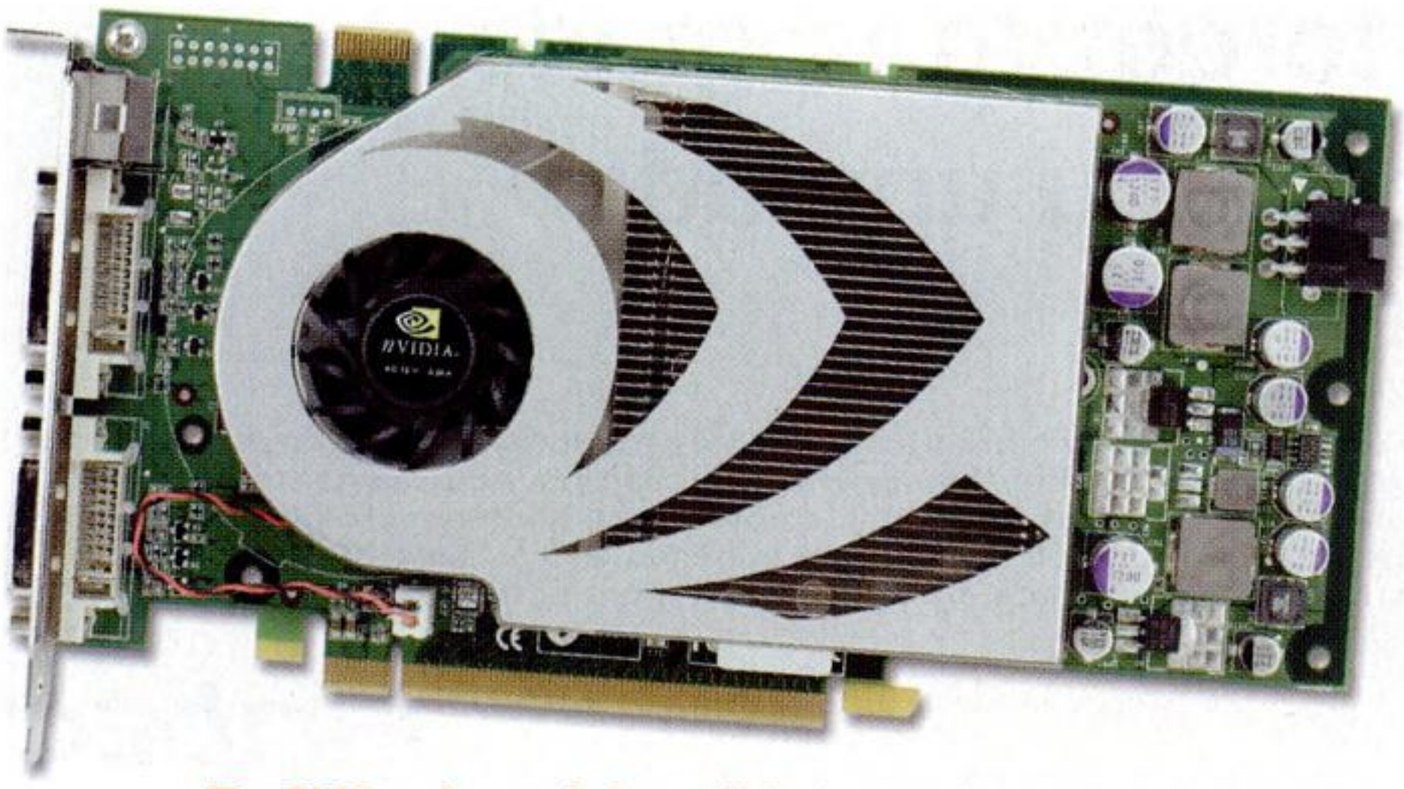
Its new R520 GPU is nowhere in site, and its dual-card CrossFire solution is missing in action. Is the company holding off because it has something very special up its sleeve, or is it in tons of trouble?



ATI has already told *Maximum PC* it would have liked to have its next-gen R520 videocard out by now, but that simply hasn't happened. On top of that, shortly after E3, ATI announced its dual-card solution, dubbed CrossFire, but that technology is also vapor as we go to press. Meanwhile, nVidia is shipping its new GeForce 7800 GTX graphics chips and SLI chipsets by the truck load. Faced with this situation, even the most hardened fanboy would have to admit it hasn't been a great summer for ATI.

And it's not just the fanboys. When *Maximum PC* quizzed top system vendors about the ATI matter, some said consumers were clearly favoring nVidia today.

"It wasn't even close [this time between ATI and nVidia]," said one vendor. "One of the armies failed to show up." The vendor, who asked that we not identify him, said this cycle is a total write-off for ATI, but he doesn't think the whole year is shot. "I don't think the race is over," he said, suggesting that if R520 is all that and a bucket of chicken wings, the ATI bashing will stop in a heartbeat.



The 7800-series cards from nVidia have so far gone unchallenged by ATI, which is highly unusual given the industry's ruthless competitiveness and never-ending one-upsmanship.

ATI denies it has taken its eye off the ball, but does agree it's facing a perception problem right now, especially among hardware forum jockeys who are hyper-aware of product-launch schedules. A spokeswoman said ATI is still on schedule with its products, and that its product cycle is within its six-to-nine month projections. She said people forget that it was ATI's competitor who didn't respond with a product when the X850 was released. "I think we all acknowledge that we would have liked to have seen (R520) earlier, but we're confident we'll have a competitive product later this summer." She also said armchair analysts who say the company has lost focus since taking on the job for Xbox 360 graphics are flat-out wrong.

Lisa Epstein, an analyst with John Peddie Research, agrees that any claims the sky is falling are quite premature. She said ATI has actually increased its market share in the most recent quarter while nVidia lost market share. Discrete videocards sales, for the X800 and so forth, have stayed flat but the profit margins have remained high. It's an area that ATI can't just ignore, she said.

"What [ATI] has been doing is responding to nVidia's moves. And [ATI] can't just leave SLI and dual cards to nVidia." When asked whether or not the latest round in the videocard war has already been won by nVidia she answered, "I just don't know yet."

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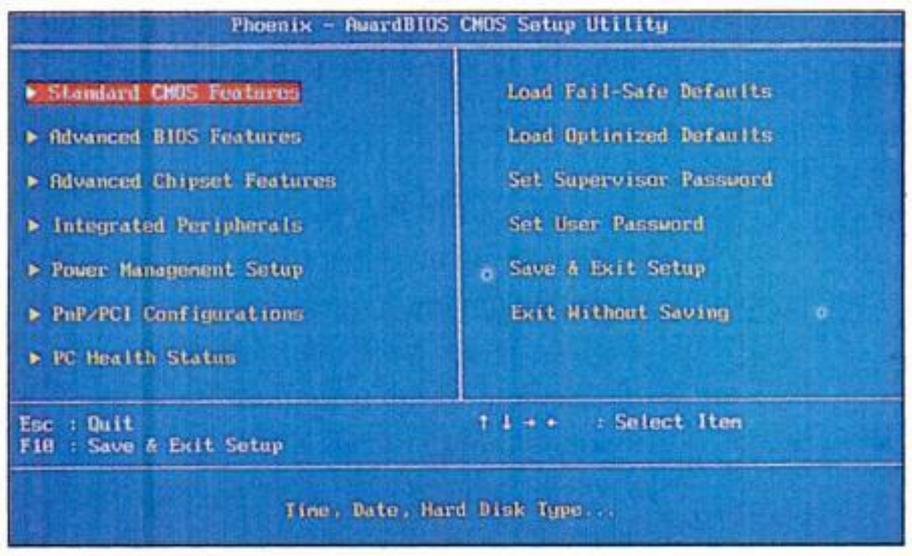
BIOS Replacement Not Dead

Intel has passed the task off to a trade group, but work continues on the fledgling hardware interface

It's been awhile since we've heard anything about Intel's project to replace the decrepit BIOS with a more efficient, standardized interface, but the latest word is that Intel has passed off the task to a trade group to complete the spec. The trade group, named the United EFI (Extensible Firmware Interface) Forum, includes representatives from PC makers such as Dell, HP, IBM, Microsoft, and others. The group's goal is to write a standardized interface for PC hardware that will replace the cornucopia of BIOSes currently in use. The EFI is also being touted as a way to reduce boot times. One ominous *raison d'être* for EFI is to allow tighter PC security and to help protect intellectual property. We all know what that means.



Could 2006 be the BIOS' swan song? The folks behind EFI would like it to be.

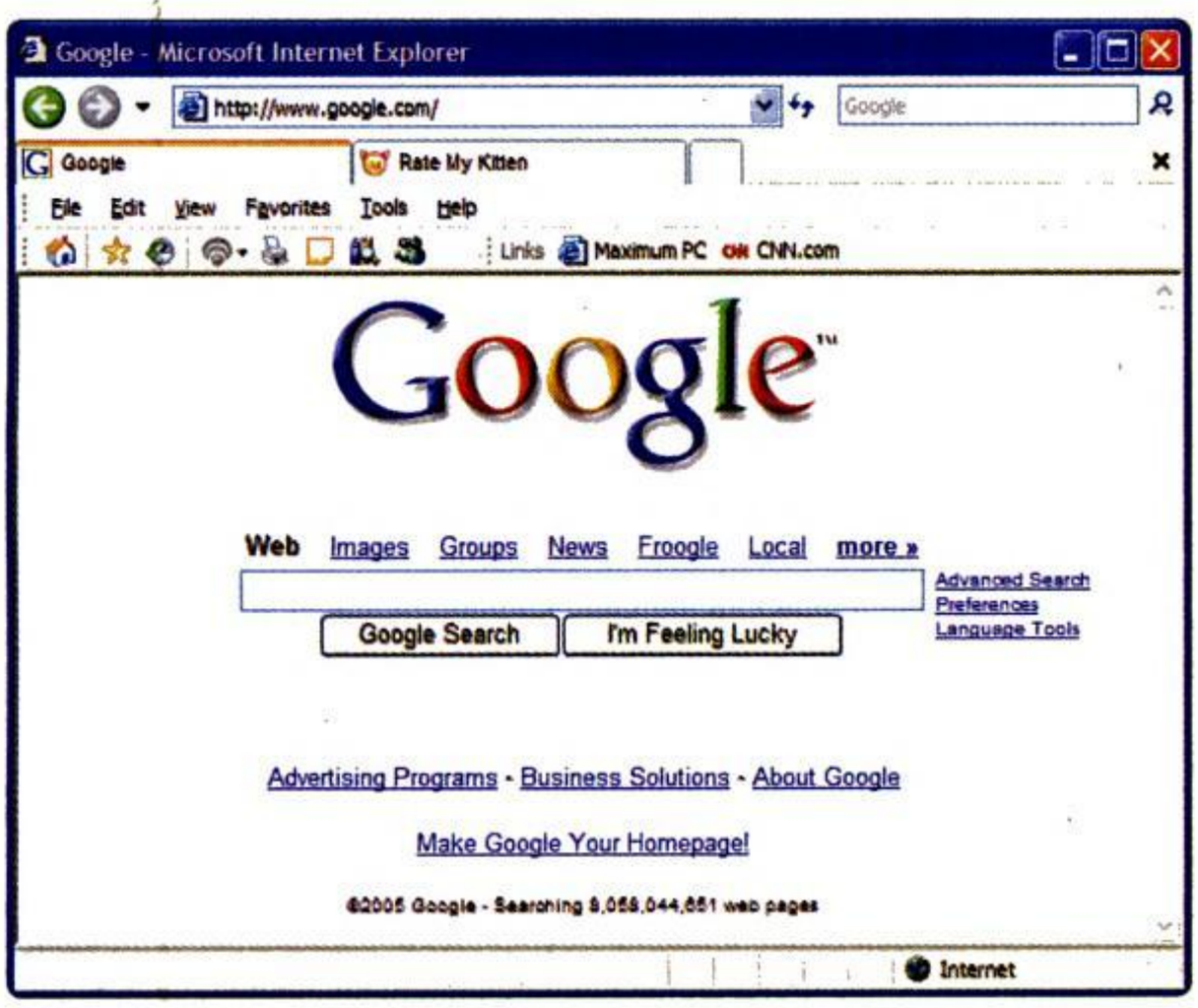
Wanna Stick it to The Man?

The nation's color laser printers are still secretly marking every single print job with a hidden code to help The Man track down counterfeiters (as we reported in our March issue). Now the Electronic Frontier Foundation has initiated a campaign to gather more information about this tricky technology, in order to protect citizens from authorities who might abuse it.

Long hours spent under a blue LED light have helped the EFF establish a small database of the types of patterns created by certain printers. You can aid this grass roots project by printing the test sheets available at www.eff.org on your own color laser printer and sending them to the EFF for analysis. You can also send pages printed at a local printing center. The EFF asks that you print a configuration page that details the model and serial number of your printer in order to match up that information with the encoded pattern.

Microsoft Unveils IE7—Now with Tabs!

Beta 1 arrives with improved phishing protection, tabs, and integrated RSS feeds



IE7's address bar is locked in place at the top of the browser to prevent a phishing attack that spoofs a site's URL in a fake address bar.

FAST FORWARD

TOM **HALFHILL**

China: The Next Intel?

I was recently embroiled in controversy after writing a technical report about a new Chinese-designed microprocessor. The controversy was inflamed by dodgy Internet news sites, and it obscured the most important conclusion of my article: that China is capable of designing microprocessors as sophisticated as any in the world.

Of course, companies have been assembling PC clones in China for some time now, but they've never used Chinese-designed and -manufactured processors. Such a move would signal a whole new ball game—not just for the Chinese, but for the entire industry.

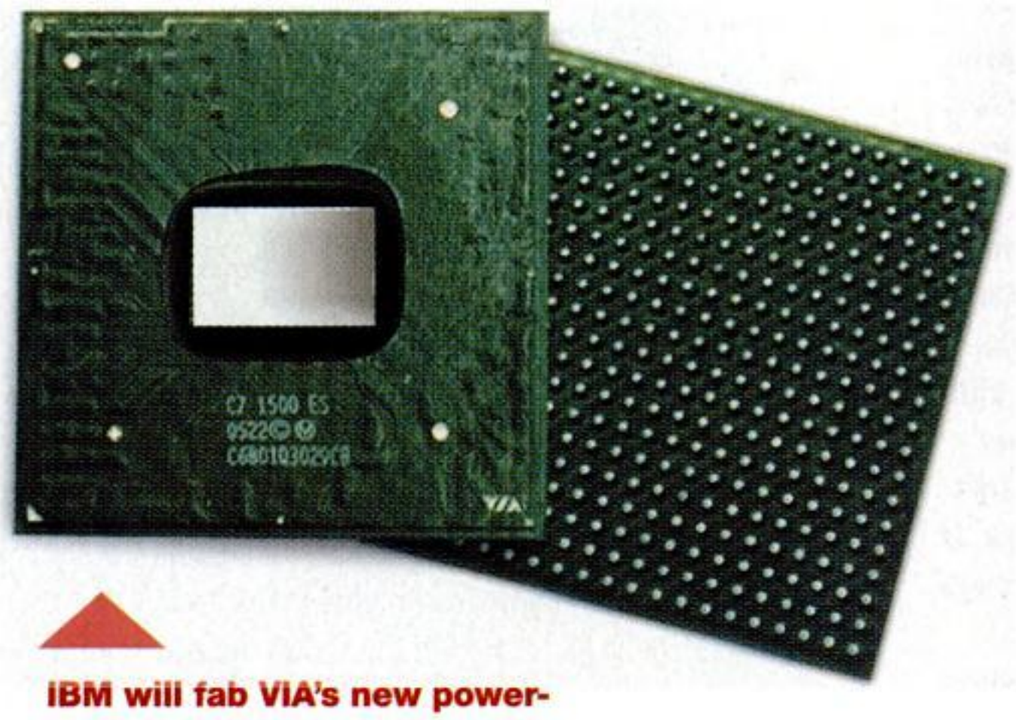
My 6,400-word analysis for *Microprocessor Report* found many similarities between the new Chinese Godson-2 processor and the MIPS R10000, introduced by MIPS Technologies in 1995. But because my data didn't support a conclusion of patent infringement, I didn't accuse China of stealing MIPS' intellectual property. Unfortunately, some news outlets recklessly made this charge, even though their writers hadn't read my article or gathered their own data.

What's important is that the Godson-2 is a powerful design: a 64-bit processor with four-way superscalar pipelines, out-of-order execution, dynamic branch prediction, media extensions, and other goodies. Top speed is only 500MHz, but that's mainly because it's intended for low-cost applications, and the fabrication technology is two generations behind (0.18 micron). A faster 0.13-micron version is coming soon.

A Chinese processor similar to the 10-year-old MIPS R10000 might not seem earthshaking, but microarchitectures have evolved little since 1995. Indeed, AMD and Intel are stepping back from increasingly complex microarchitectures in favor of simpler, dual-processor cores integrated on one chip. Today's Godson-2 design isn't far behind a Pentium 4 or Athlon 64, and the Chinese want to integrate four cores in the future Godson-3.

The Godson-2 is mostly MIPS compatible, so it runs Linux and other operating systems, but not Windows. To crack the worldwide PC market, China needs an x86. Interestingly, a Chinese company recently licensed Transmeta's x86-compatible Crusoe and Efficeon processors. That deal gives the Chinese a legal doorway into PCs, at least at the low end. While AMD and Intel squabble with each other, a formidable new competitor is rising in the east.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.



IBM will fab VIA's new power-efficient C7-M notebook CPU.

New VIA CPU for Lil' Notebooks

Cool and cheap. That's the motto for VIA's new C7-M CPU. The company says its new proc will sip 7 watts—a similarly clocked Pentium M guzzles 21 watts. It has No Execute bit support and onboard encryption hardware. Performance? VIA says it's not as fast as Pentium M, but it's also not as slow as Transmeta.

World's Smallest Hard Drive

Teeny 2-gigger arrives

According to the *Guinness Book of World Records*, Toshiba's 2GB 0.85-inch hard drive is the smallest in the world. And by the time you read this, it should be appearing in Imation's new Micro Hard Drive. The internal drive is smaller than a quarter yet it boasts an impressive 2GB capacity. There's even a 4GB version waiting in the wings for release this winter.

Imation's wee drive is shaped like a padlock, with the USB 2.0 cable forming a loop that you can hook to a belt loop or pierced appendage. It will offer full 128-bit hardware encryption and will retail for about $150.

Tiny hard drives are usually painfully slow, but we don't really mind when they're as cute as this 2GB Imation drive

New AMD Sockets on the Way

We've wondered when AMD would make the leap from DDR memory to DDR2 SDRAM ever since Intel switched over last year. Though AMD won't confirm any of this information, scuttlebutt has it that the answer is mid-2006. In order to make way for the super-fast memory, which runs at 667MHz compared with DDR's 400MHz, the company will consolidate its current CPU sockets—Socket 939, 940, and 754—into two all-new sockets in 2006. The socket switch will not only simplify AMD's product line, but will pave the way for the company to migrate from DDR SDRAM to DDR2 SDRAM—a move that many in the industry feel is long overdue, as Intel has been offering DDR2 in its flagship chipsets for more than a year now.

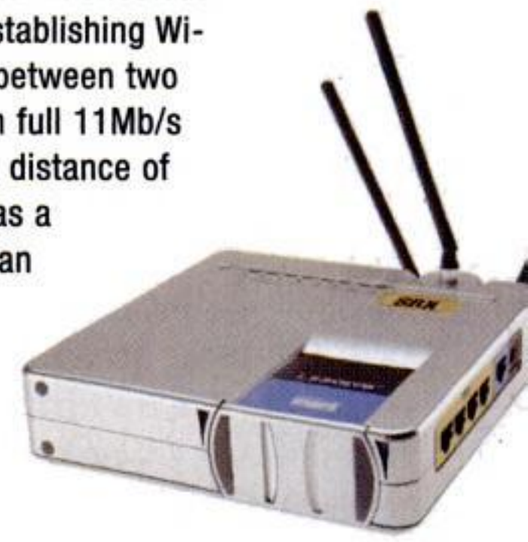
The socket for home users—dubbed Socket M2—will sport a 940-pin design and use DDR2 dual-channel memory. It's reported that by mid-2006, all of AMD's consumer-level CPUs, including the budget-priced Sempron, Athlon 64, 64-FX, and X2 dual-core CPUs, will use the M2 platform. By consolidating current Socket 939 and Socket 754 processors, motherboard choices (and upgrading options) for the enthusiast should be greatly simplified.

AMD also has plans to transition its server-oriented Socket 940 platform to a new 1,027-pin platform named Socket F. Socket F will also support DDR2 and will be used exclusively for the company's high-end Opteron processors (the 100 series will temporarily use Socket 939, then move to M2 next year).

FUNSIZENEWS

WOW-FI

Several college students from Ohio recently won a Wi-Fi shootout in Nevada by establishing Wi-Fi connectivity between two computers, with full 11Mb/s bandwidth, at a distance of 125 miles. It was a new record for an unamplified connection. The record for an amplified Wi-Fi signal stands at 192 miles, but it was achieved using a weather balloon as well as signal amplifiers. Wi-Fi purists scoff at such techniques that sidestep the inherent limitations of ground-based networks.



BUYING CRAP ON EBAY

A Missouri man is being sued by the state attorney general for sending random crap—and we mean that literally—to people who won his auctions on eBay. He contracted to have a third party send boxes of arbitrary items, including human feces, unwanted clothes, and industrial rags, to the hapless eBay patrons.

MONKEYS FLY OUT OF OUR...

Holy mother of pearl. Apple has finally released a two-button mouse! Dubbed the Mighty Mouse, it features a one-piece shell that is touch-sensitive. So the mouse retains the smooth Apple trademark look, while sporting two perfectly usable buttons. It even has a scroll ball. And it has side buttons too. Not too shabby, Jobs.

CHEAPER IPOD BATTERIES

Speaking of Apple, the quirky Cupertino-based computer maker known for its black-turtlenecked company culture has announced a price reduction for replacing the battery in an out-of-warranty iPod. The company previously charged $99 to replace the battery, but has now lowered that fee to a more manageable $59. Thanks, Steve!

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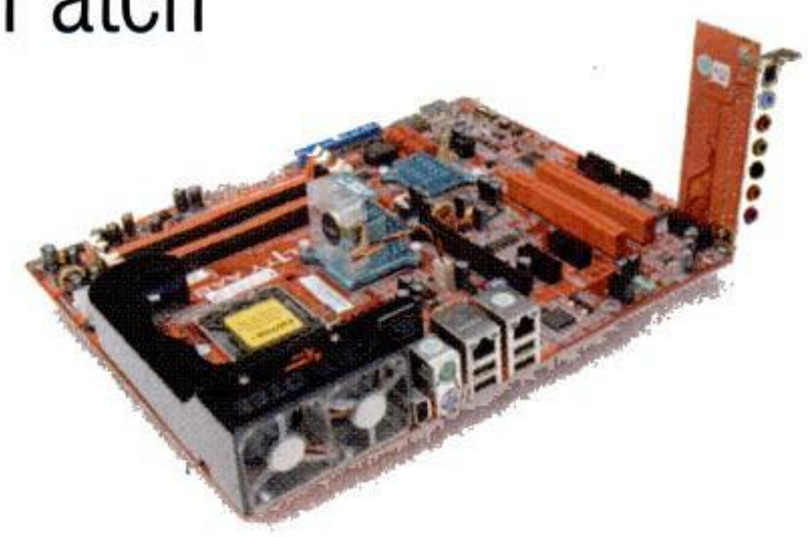
Abit Hits a Rough Patch

Financial woes hit mobo maker



According to a recent report in *DigiTimes*, motherboard and videocard maker Abit is trying to recover from a spate of financial problems. The company is reportedly on shaky ground these days, with banks threatening to freeze the company's assets. The banks made this threat recently after the Taiwan Stock Exchange forced Abit to provide a full accounting of its present financial situation.

We asked an Abit spokesman about the hoopla and he confirmed that the company did experience some additional scrutiny recently. "Everything you read [about the Taiwan Stock Exchange] is true," said Abit spokesman Harry Yen. "However, none of that has affected our sales at this point [and] Abit was never delisted from the Taiwan Stock Exchange.

Preview

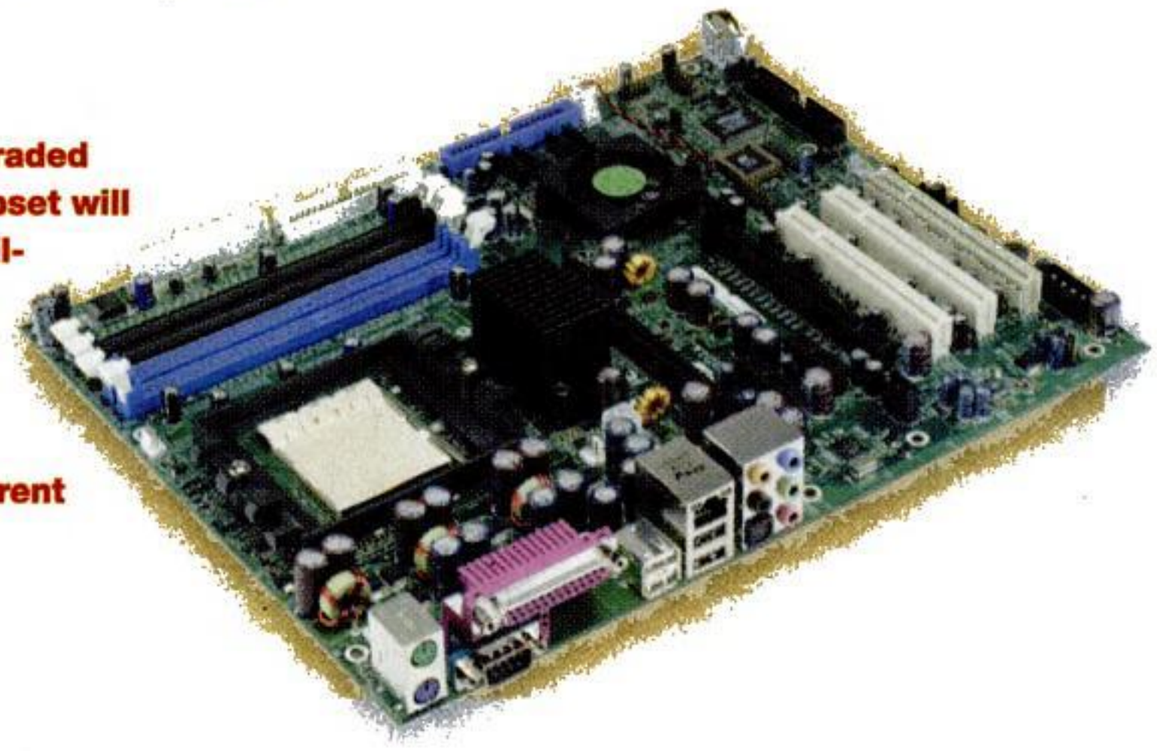
nVidia Takes SLI Mainstream

Also introduces new high-end dual-card chipset and a midrange 20-pipeline videocard

Dual videocards aren't just for hardcore gamers anymore. This fall nVidia mobo vendors will begin shipping SLI-enabled motherboards that cost less than $100. That'll happen after the company launches upgraded versions of its nForce4 chipset for Athlon 64/FX processors and Intel Pentium 4/D chips that feature two full-speed x16 PCI-E slots. Current SLI-enabled motherboards sport just two x8 slots. The nForce4 SLI x16 chipset will feature a total of 40 PCI-E lanes, which is twice the number of x16 lanes found on most consumer boards.

nVidia also plans to kick ATI while its down, by releasing a new GeForce 7800 GT board. The GT board will feature 20 pixel-shader pipelines and 256MB of DDR3 memory. With the right clock speeds, that could make the $450 card faster than ATI's flagship Radeon X850, which has only 16 pixel-shader pipelines.

The introduction of the 7800 GT will cause the 16-pipe GeForce 6800 GT to drop to $300, and the 12-pipe 6800 will fall to $200.



nVidia's upgraded nForce4 chipset will sport two full-speed x16 PCI-E lanes instead of the two x8 lanes on current boards.

GAME THEORY

THOMAS **MCDONALD**

Happy Fun Golf

As most golfers will tell you, golf isn't a multiplayer-friendly game. A golfer competes against the course: The other golfer is just there for companionship. Comparison of scores is mostly used to determine who pays for the drinks at the 19th hole. So when I heard about a massively multiplayer golf game, my first thought was "Koreans."

You see, massively multiplayer has long occupied an important niche in Korean computer gaming culture, with millions of gamers signing up for arcane games often played in "PC Baangs" (literally "PC rooms") thick with cigarette smoke and keyboards sticky from spilled soda.

Without a role-playing hook, however, a game is unlikely to catch on in Korea. Thus, we get an unlikely collision of anime style, leveling-up, inventories, and golf in *Shot-Online* (**www.shot-online.com**). In the game, you create a character, practice and play to gain experience, and then level up to increase stats such as driving power and endurance.

Along the way you earn money, compete in matches, and at some point, take on quests to obtain special gear. The game is, like many Korean MMO games, extremely rough around the edges, with plenty of Korenglish ("Please look for character who has mark of interrogation above head!"), a pathetically small library of sound effects encoded at approximately 8Kb/s (combined), and a putting grid lifted from *Tron.*

Yet for all its homemade qualities (or perhaps because of them), the game is strangely compelling. Because of the deliberate hobbling of level 1 characters (a perfect hit with a 1-wood should go further than 150 yards), the bizarre role-playing stat-twiddling item-gathering elements become a quest to squeeze out a little more yardage, a little more accuracy. The "massively" part of the MMO equation is of dubious merit, but it does provide a leaderboard and a server full of live golf competitors, which in turn helps increase the amount of money you can win and thus the goodies you can buy.

And like every good RPG, it's all about the goodies, whether it's a +15 Sword of Healing or a +2 pitching wedge.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

Winner, Best RPG of E3

– Game Critics Award, GameSpot, IGN, GameSpy, Xbox Evolved, Console Gold, Daily Game, Games Domain

"One look at Oblivion will shatter your conceptions about what is possible in a video game."

– GameInformer

"The biggest title for the Xbox 360™, and the one I'm most looking forward to."

– GamePro Magazine

"Oblivion is, at this time, the best-looking game I have ever seen in my life."

– Xbox.com

"To call the graphics 'amazing' is an extraordinary understatement."

– GameSpy

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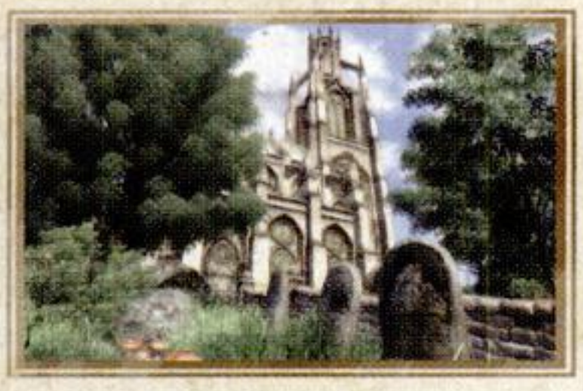
The RPG for the Next Generation



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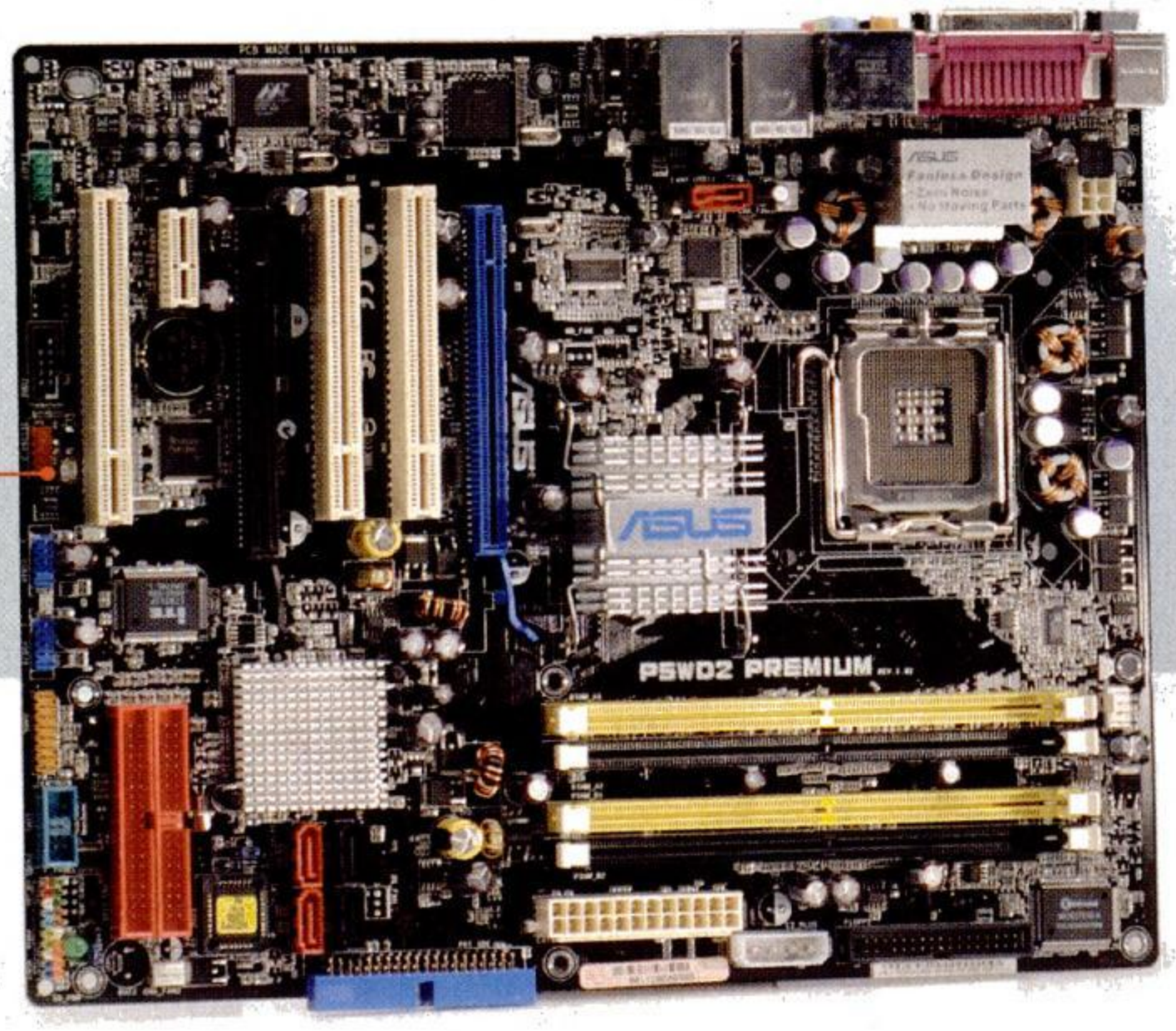
Pentium 4 Chipset **Showdown**

People building Intel systems have a difficult choice of late: Do you pull the trigger on a motherboard with a reliable Intel 955X chipset or pass it up for nVidia's new nForce4 SLI Intel Edition chipset?

To make matters worse, the often strained relationship between Intel and nVidia is producing peculiar incompatibilities. Intel's dual-core Pentium D 820, for example, won't work with the nForce4 SLI IE. In fact, nVidia doesn't even officially *support* dual core. And even though several Intel 955X motherboards *should* work with SLI, they don't.

To get to the bottom of the mess and finally declare a chipset safe for your consumption, we grabbed a pair of LGA775 boards from Asus to pit head-to-head. We figured using the same manufacturer for both boards would eliminate manufacturing and material inconsistencies, making it a more even fight.

BY GORDON **MAH UNG**



INTEL 955X: Asus P5WD2 Premium, $225, www.asus.com

round 1 FEATURES

Pentium 4/D chipsets (including the two boards we looked at) are so rich in features that our doctor told us to cut back to one use a week. Both support processors running 800MHz and 1,066MHz front-side buses, but only the Intel 955X gives you full support for all of Intel's dual-core procs. The 955X also gives you HD Audio support with the option of a real-time Dolby Digital encoder, as well as Matrix RAID, which lets you create multiple striped and mirrored arrays on just two drives. The nForce4 SLI IE is no slouch, either, with its hardware firewall, ability to use both PATA and SATA drives in one RAID array, and the option of running two nVidia cards in SLI. **WINNER: TIE**

round 2 COMPATIBILITY

Unfortunately for nVidia, the 955X supports every single LGA775 processor you can buy. You can't say that about the nForce4 SLI IE. nVidia leaves dual-core support up to the motherboard vendor, and even on motherboards that support dual-core, some of the slower dual-core CPUs might not work! We have no choice but to award this category to Intel.
WINNER: INTEL 955X

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round 3

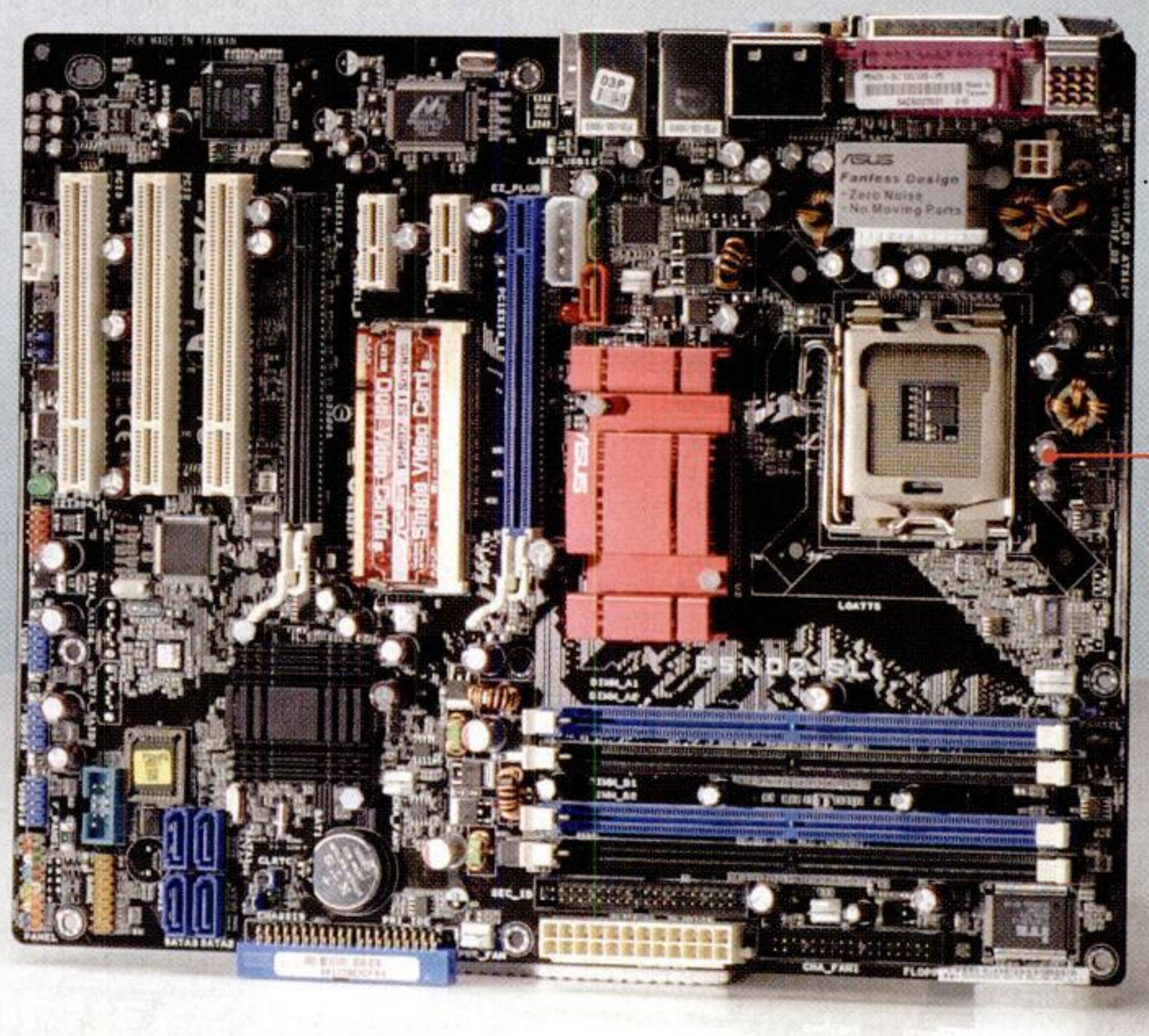
AVAILABILITY
We define availability as the ability to buy the damned hardware. We checked with motherboard vendors and found that the major sellers either offer or plan to offer boards with both the 955X and nForce4 SLI IE chipsets. We then checked online retailers and found there were fewer than 10 boards available using either chipset. Because both chipsets are relatively new, it'll probably take another few months for the offerings to increase, but we're not impressed. **WINNER: NEITHER**

round 4

DUAL-VIDEOCARD SUPPORT
You don't want a motherboard that's incapable of supporting two PCI-E graphics cards. Today, dual-videocard support is really all about nVidia's SLI, which lets you aggregate two videocards to increase 3D performance in some games, and which is currently off-limits to any Intel chipset. Certain Intel boards, such as the Asus P5WD2 featured here, offer two full length PCI-E slots to "support two graphics cards for more than two monitors," but even though Asus includes an SLI cable, and two nVidia boards will work in the system, they simply won't take advantage of SLI. We strongly believe that ATI will offer its dual-videocard CrossFire technology on the 955X, but for now this category goes to the tried-and-true nForce4 SLI IE. **WINNER: NFORCE 4 SLI IE**

round 5

PERFORMANCE
This is where the silicon meets the benchmark. Intel almost always maintained a performance edge over other chipset vendors in the past, but nVidia just squirts past Old Faithful on this one. We won't call it total annihilation, but when you look at the benchmarks on the following page it's clear the nForce4 SLI IE holds a razor-thin performance edge over the 955X. It might have even been a tie had the 955X outrun the nForce4 SLI IE in more than two tests, but the NF4 is clearly a tad faster (for more results turn to page 18). **WINNER: NFORCE4 SLI IE**



NFORCE4 SLI IE: Asus P5ND2-SLI Intel Edition, $230, www.asus.com

Our Testing Method

We opted to pit the 955X against the nForce4 SLI Intel Edition using two boards from Asus. Representing Intel is Asus' P5WD2 Premium board. In the nVidia corner is the P5ND2-SLI Deluxe. We used a common set of components for both: a 3.73GHz Pentium 4 Extreme Edition operating on the 1066MHz front-side bus, 1GB of Crucial Ballistix DDR2/667, a 160GB Seagate Barracuda SATA drive, and an MSI GeForce 7800 GTX card. We manually locked down the bus speeds, memory clocks, and videocard clocks so they were as similar as possible. We then installed a clean copy of Windows XP Pro with SP2 on each machine. We selected benchmarks that would tap the chipset and RAM subsystems more than the videocard.

Continued on page 18→

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The Showdown

Intel 955X vs. nVidia nForce 4 SLI Intel Edition

To test the chipsets we selected a set of benchmarks that would stress the overall graphics implementation, the RAM subsystem, and the hard drive I/O. Older benchmarks, such as *3DMark2001 SE* and *Quake III* stress the memory controller and CPU instead of the videocard, so they're far better for judging a chipset's performance. We also used the new *PCMark05* to judge other system components such as RAM and hard drives. Serious Magic's 3D load test slams data to the videocard as fast as possible, stressing the PCI-E bus in the process. The faster the videocard interface, the higher its scores will be.

In Pentium 4 chipsets, performance is all about the memory controller. The faster the memory interface, the better the overall performance. Intel has a lot of experience building fast memory controllers, but nVidia also has a lot of experience building fast memory controllers for its graphics chips.

In the majority of the tests we used, the nForce4 SLI Intel Edition was a tick faster than the Intel 955X. When we say "tick" we don't mean 3 or 4 percent, we really mean one tick—1 percent or less. In most cases, we'd label it a tie because the difference is within the margin of error for the benchmark. However, the nForce4 has a very consistent, albeit tiny edge over the 955X. That's no small accomplishment when you consider Intel's speedy-chipset chops. When we factor in SLI, the scales tip further to nForce4 in all the graphics-intensive tests.

BENCHMARKS

	INTEL 955X	NVIDIA NFORCE4 SLI IE
3DMark03 overall	16,649	**16,696**
3DMark03 CPU	1,085	1,083
3DMark2001 SE overall	26,419	**26,709**
3DMark05 overall	7,526	7,534
3DMark05 CPU	**5,848**	5,793
Quake III	513fps	509fps
SiSoft Sandra 05 RAM bandwidth	6,596MB/s	**6,697MB/s**
PCMark2005 overall	4,953	**5,021**
PCMark2005 memory	4,997	**5,092**
PCMark2005 graphics	6,176	**6,299**
PCMark2005 hard drive	5,017	**5,326**
AquaMark graphics	12,618	12,651
AquaMark cpu	11,329	**11,720**
AquaMark overall	81,051	**82,182**
3DD Load PCI-E performance	1,208MB/s	**1,296MB/s**

** Best scores are bolded, except where difference between chipsets is within the margin of error.*

And the Winner Is...

Despite our misgivings about nForce4's spotty dual-core support, we're going to recommend the nForce4 SLI Intel Edition and cross our fingers that the chipset will work with the next dual-core CPU from Intel. Even if it doesn't, you can run the fastest P4EE available today or the Pentium D 840 for dual-core support. And you know you can at least run SLI. That's far better than hoping that SLI and CrossFire support appears on the 955X at some indeterminate time in the future. MPC

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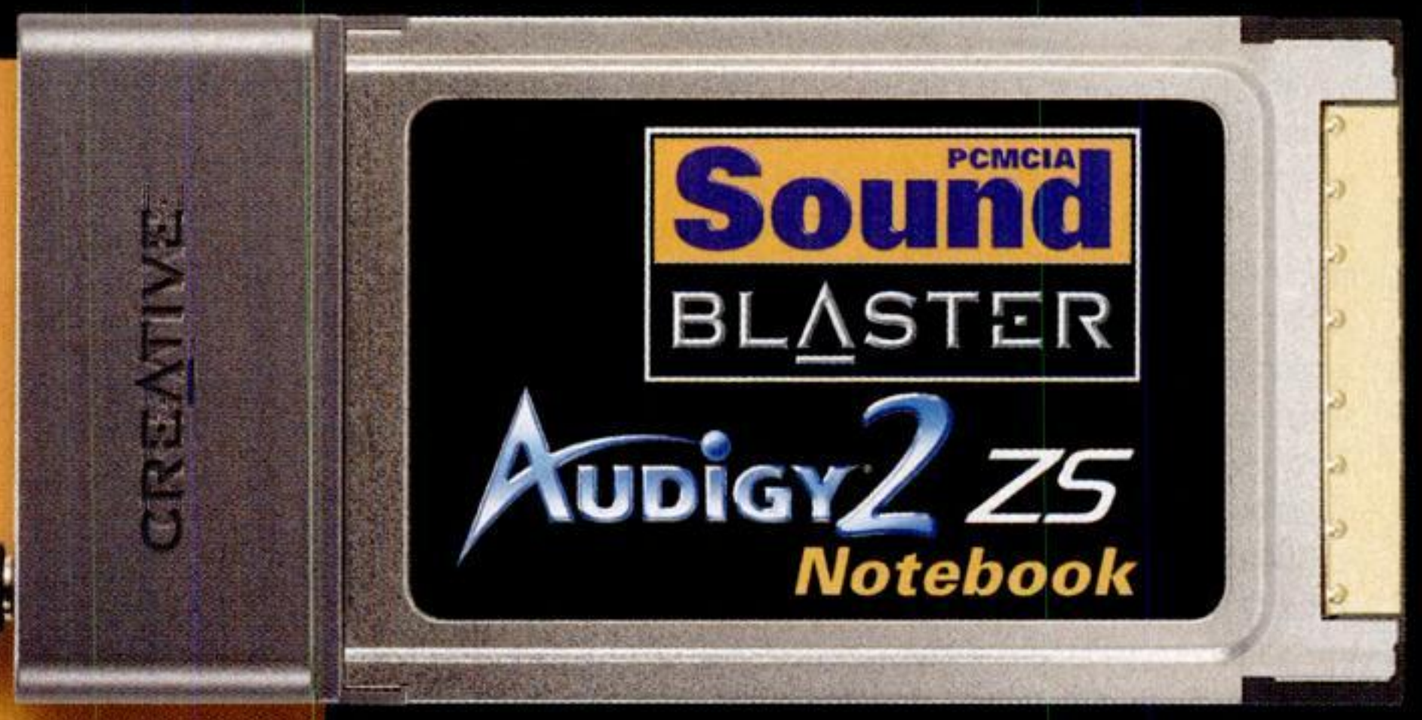

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Jake, Watchdog of the month

Our consumer advocate investigates...

✓Micro Solutions ✓Dell ✓Intergate.com ✓Globe2000.com

MICRO SOLUTIONS PUT IN A LOCKBOX

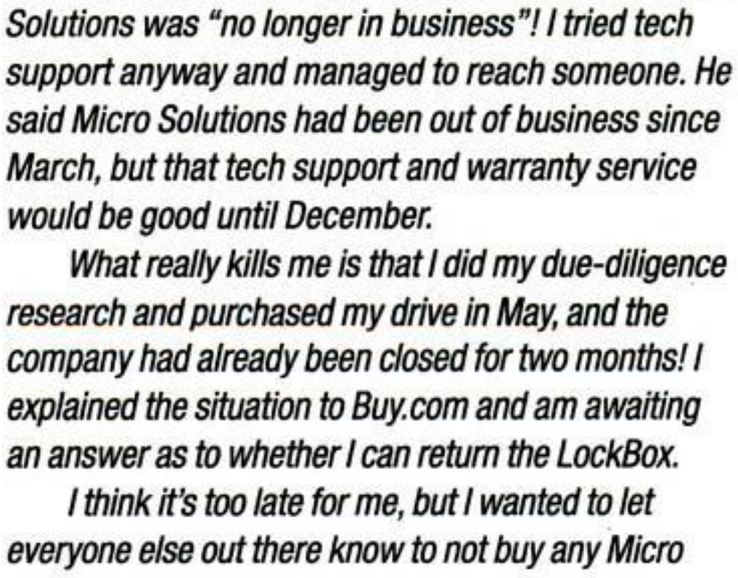
I recently bought a new external hard drive with fingerprint authentication, called the LockBox from Micro Solutions. I'm currently deployed with the U.S. Army in Kosovo, so I had to have it shipped to my house first. It broke after a week of use. The unit has a one-year warranty, so I sent it in for repair after speaking to a Micro Solutions' technician. He said it was likely the results of a bad circuit board and that it would be replaced. When I got the unit back, there was nothing in the box that indicated it had been fixed, so I called Micro Solutions again. This time the main message on the answering machine said Micro Solutions was "no longer in business"! I tried tech support anyway and managed to reach someone. He said Micro Solutions had been out of business since March, but that tech support and warranty service would be good until December.

What really kills me is that I did my due-diligence research and purchased my drive in May, and the company had already been closed for two months! I explained the situation to Buy.com and am awaiting an answer as to whether I can return the LockBox.

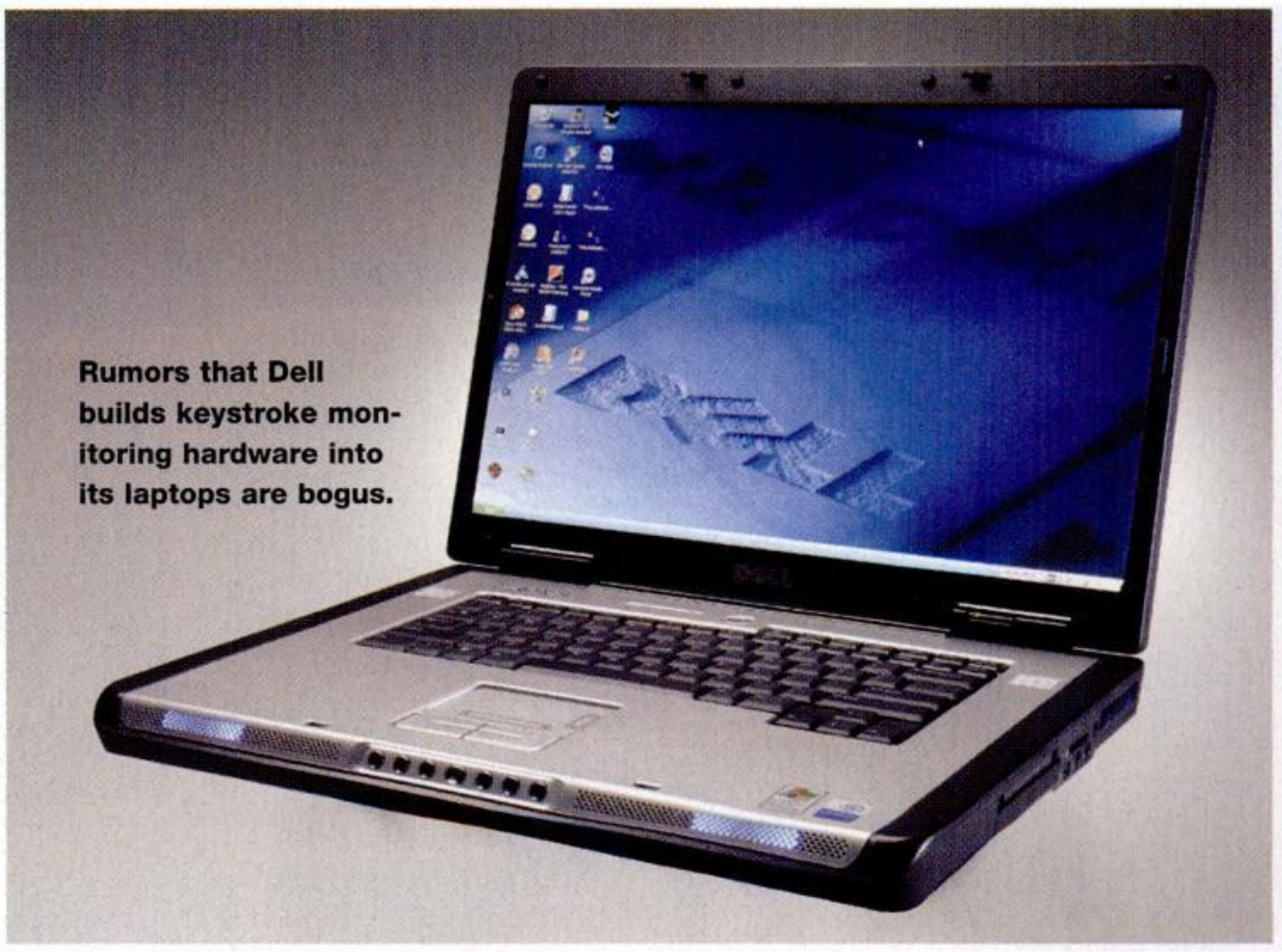
I think it's too late for me, but I wanted to let everyone else out there know to not buy any Micro Solutions products.

—Lt. John M. Oros

Thanks to John for alerting the Dog and other *Maximum PC* readers to avoid Micro Solutions products. The Dog confirmed that Micro Solutions' phone lines say the company is kaput. Micro Solutions' website, though, doesn't indicate that anything is wrong. The Dog attempted to reach the founder of Micro Solutions, but repeated calls to his home were unanswered. It's a sad tale, too. Micro Solutions is an old hand in the PC world; the Dog himself remembers paying $300 for a Micro Solutions BackPack parallel port 1x CD-ROM drive back in the day. Ah, well. Readers should consider themselves put on notice to avoid Micro Solutions' products given the impending lack of technical and warranty support. Woof.



Micro Solutions is asking consumers to "pull my finger" after going out of business earlier this year.



Rumors that Dell builds keystroke monitoring hardware into its laptops are bogus.

IS MY LAPTOP SPYING ON ME?

I recently received an email linking to a website that claims Dell builds key-logging devices into its notebooks. The website has pictures of a Dell notebook taken apart, with pictures of a key-logging device embedded in it. Whenever I hear something that I believe is too far-fetched, or too good to be true, I do my research. This recent revelation, however, is a little hard to verify when you don't have the budget to buy a laptop for the sole purpose of dismantling it. Can you get to the bottom of this?

—Vincent

You're the recipient of a bizarre hoax email/website that's making the rounds on the Internet. The website and email claim that Dell secretly builds a key-logging device into its laptops at the behest of the Department of Homeland Security. The hoax even includes a mocked-up letter from the DHS to "prove" its authenticity. Dell denies this and the rumor has been thoroughly debunked by such sources as Snopes.com, a website that chronicles urban legends. The pictures of the device are apparently purloined from other websites. Hardware key-loggers aren't hoaxes, though. KeyKatcher.com's KeyKatcher Pro and Amecisco.com's Hardware KeyLogger work on the same principle as the hoax hardware, except that they're the real deal.

MY UNLIMITED ACCOUNT HAS LIMITS

I pay $9.95 a month for "unlimited" access to my ISP, Intergate.com. Unfortunately, I recently discovered that it's not so unlimited. I like to leave my computer on and connected to the Internet even when I am not using it. Today I tried logging in and was told the pass-

Continued on page 22→

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GOOD VS. EVIL

PLAYER VS. PLAYER

EverQuest II

Desert of Flames

WHERE ADVENTURE COMES ALIVE™

Discover the mysteries of an exotic new realm in the first Expansion Pack for the critically acclaimed MMO, EverQuest II.

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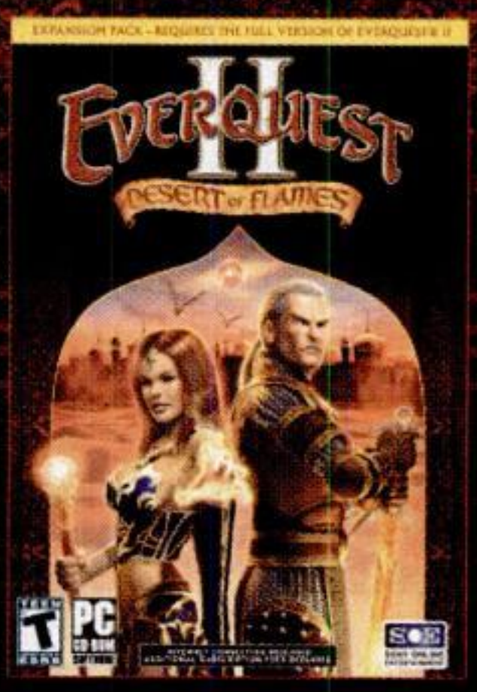

Confront Warring Factions, access Guild Vaults, and play up to Level 60 with Level Range increase.

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Continued from page 20

word was incorrect.

I called tech support and was told that I left my Internet connection on too many hours in one day. The connection must be on a timer or something because after six hours, it logs me off. When I signed up, I saw nothing on the website saying my account would be suspended if I used it for too many hours in one day.

Doesn't "unlimited" use mean you can use it as long as you want? The company now says I have to pay this month's charge but that my account is automatically suspended for 7-10 days.

The tech told me there was nothing he could do except charge me another $9.95 for a temporary account until mine is unfrozen. It seems illegal for a company to charge for unlimited access and then limit my use without telling me. If you could look into this and let me know what you think, that would be great.

I am canceling this service and getting DSL when my month is up.

—Matt

Nationwide ISP - $8.25 Internet Access Services - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
Back Forward Reload Stop Home History
http://www.intergate.com/isp/index.shtml
Nationwide ISP - $8.25 Internet Acce...
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Welcome, Kim Komando listeners!
The Kim Komando Show
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EASY SETUP
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terms & conditions
OR CALL TOLL-FREE: 1-866-866-2003

For some ISPs, "unlimited" doesn't mean unlimited time online.

The Dog called Intergate.com and spoke with a manager who confirmed that "unlimited" doesn't actually mean unlimited time online. It only means consumers can dial the ISP an unlimited number of times. The manager said that because of the contract Intergate has with its backbone provider, users who log in and "hog" lines will be flagged and their accounts frozen for a few days. But it shouldn't come as a surprise, the manager said, because it's spelled out in the terms and conditions of the contract. He then referred the Dog to company executives for further clarification. Executives of the company did not respond to the Dog's emails requesting clarification of the policy.

The Dog couldn't review Intergate's terms and conditions without signing up for an account, but it's clear there's a difference between what consumers think is unlimited and what Intergate thinks is unlimited. To find out if Intergate's salespeople inform consumers of this policy, the Dog called the sales number for Intergate and asked a rep what "unlimited" means. The Dog was told it means unlimited ability to dial in, not unlimited time. In reality, the rep told the Dog, it works out to about 11 hours a day.

So what's the official definition of "unlimited access"? The Dog asked David Gower of the Texas ISP Association if there are any national guidelines for the term. Gower said none existed that he was aware of, but in his opinion it means that you can't be connected 24/7 but you can dial up as much as you want. Most ISPs pay an average of $30 for each phone line or port, and they use timers to disconnect users who are connected more than a few hours.

But, he added, it's a little unusual for an ISP to penalize a person for being connected too much. "I would say most [ISPs] have a limit, but maybe not a penalizing limit. The fact that they disabled him sounds like he doesn't have unlimited access." But, Gower said, it's really the terms and conditions that matter for each individual ISP.

There are a couple things you should do here, Matt. The first is what you're already planning to do: take your money somewhere else. The second is to look at your terms and conditions to see if they do define exactly what "unlimited" means. If not, the Dog thinks you should at least file a complaint with your state Attorney General, because unlimited access shouldn't mean unlimited connection attempts, it should mean unlimited access.

CAN'T GET MY SOFTWARE

*I bought a Pioneer DVR-A07 DVD burner from Globe 2000 Corp (**www.globe2000.com**). The main reason I chose this company was for the software bundle. The problem is that I didn't get the bundle! I tried to contact the company several times, to no avail. I complained to the Better Business Bureau and wanted your readers know to avoid these guys.*

—Shannon Waldhauer

The Dog contacted a Globe 2000 spokesman who insisted that Shannon was likely sending email to the wrong address. "All he has to do is email us and we will send him a copy. This is not a big problem. I don't know what email address he's been sending his problem too, but obviously it was not to me," he said. The Globe 2000 spokesman promised to expedite the software to Shannon once he was contacted. Sounds fair, but this pattern of customer service isn't new.

The Better Business Bureau rated the California-based store as "unsatisfactory," and the Bureau's records show a "pattern of non-response to consumer complaints as well as a pattern of unresolved complaints brought to its attention by the Bureau."

Reviews of the store are also mixed at ResellerRatings.com, a site where consumers can vent their spleens or jump for joy over vendors. One consumer wrote: "You are taking your chances if you buy from Globe2000. It's very hard to get them to send an RMA if you ever need to return anything. I have emailed them seven times, called the customer-service number (the answering machine is full), and even faxed the store. It's been seven days and I still don't have an RMA. You might as well throw your order in the trash if it doesn't work." Another customer, however, disagreed: "I ordered 15 copies of OEM software and two optical mice. They had the lowest prices for both, so I couldn't resist ordering. Everything went well, they even had pretty cheap shipping." Woof. MPC

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maxumumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

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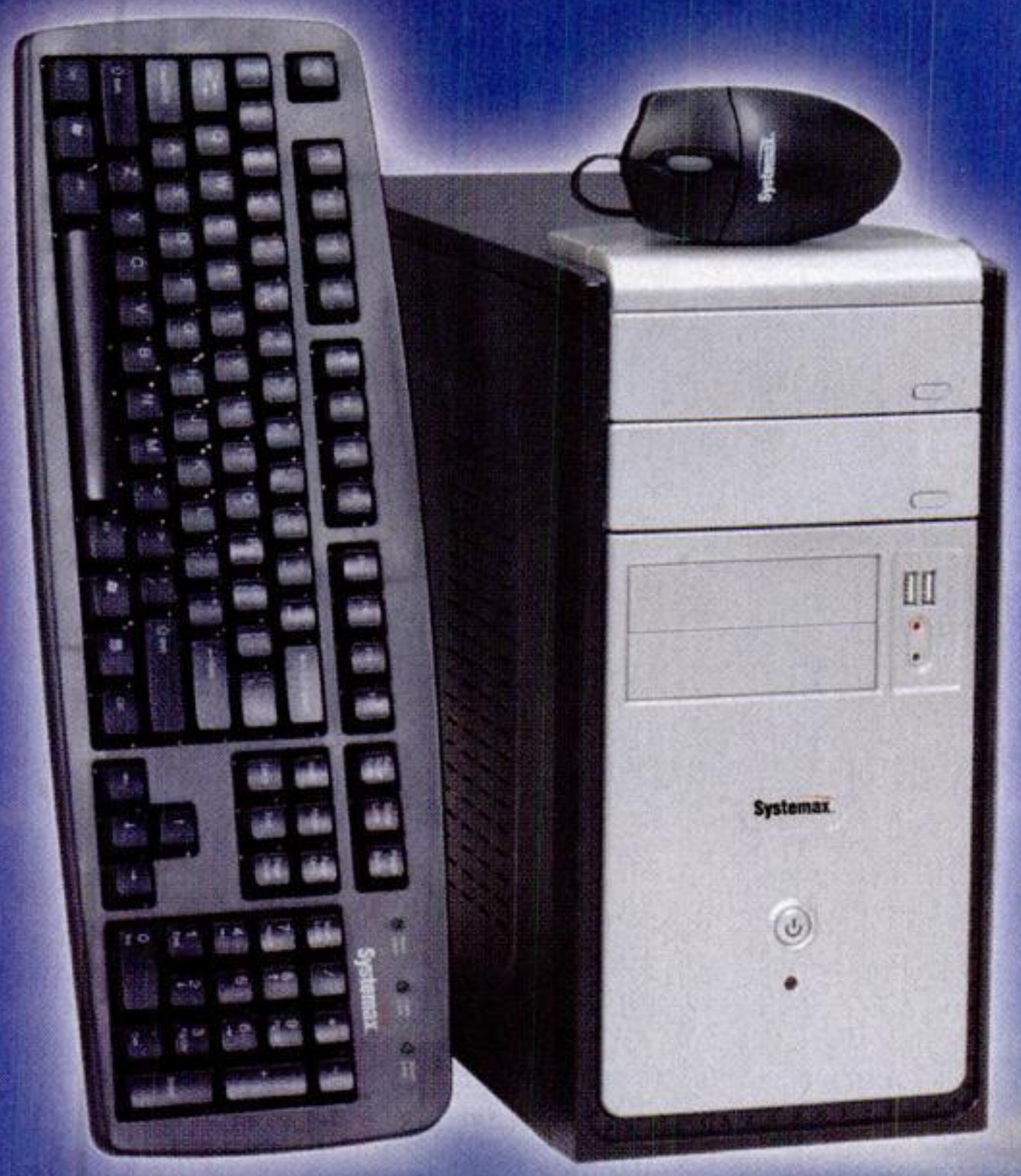

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Windows VISTA Comes Together

Microsoft's next version of Windows will be around for 10 years, when it finally arrives. Here's a sneak peek at the tricks and treats you can expect from Vista when it's assembled in 2006

BY WILL SMITH

So here we are. Four years after Microsoft released Windows XP, the once-perfect operating system is plagued by insecurities, viruses, and spyware. No one's safe—even *Maximum PC* editors have suffered under these scourges. Sure, Service Pack 2 has helped the problem some, the firewall has slowed the distribution of worms, and *Internet Explorer* is a bit more secure, but spyware is still everywhere.

The answer—at least according to Microsoft—is Windows Vista. Vista, which you may know by its code-name Longhorn, is the next major release of Windows. Microsoft's goal with the new OS is to streamline and simplify. Key components of the OS have been rebuilt from the ground up. Unnecessary legacy components have been excised. Legacy code that remains necessary for the time being has been compartmentalized, for easy and safe removal later. Major portions of the OS have been revamped, with an eye toward the way people want to use their computers now, not the way they did in 1995, when PCs (and graphical interfaces) were a novelty for most computer users.

We just got our grubby mitts on the first beta of Vista, and have prepared a guided tour for you—with loads of photos, and a feature-by-feature walk-through of the new OS. Keep in mind that this is just the first beta. Before the fledgling OS is ready to fly late next year, the code monkeys at Microsoft will continue to tweak the user interface, add new features, and refine existing elements. The vast majority of the final changes should be in place by the time Microsoft ships Beta 2, toward the end of this year. What you see here could (and probably will) change before Vista launches in late 2006. This is a hint of what's to come rather than an iron-clad prophecy of the future.

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New Technology

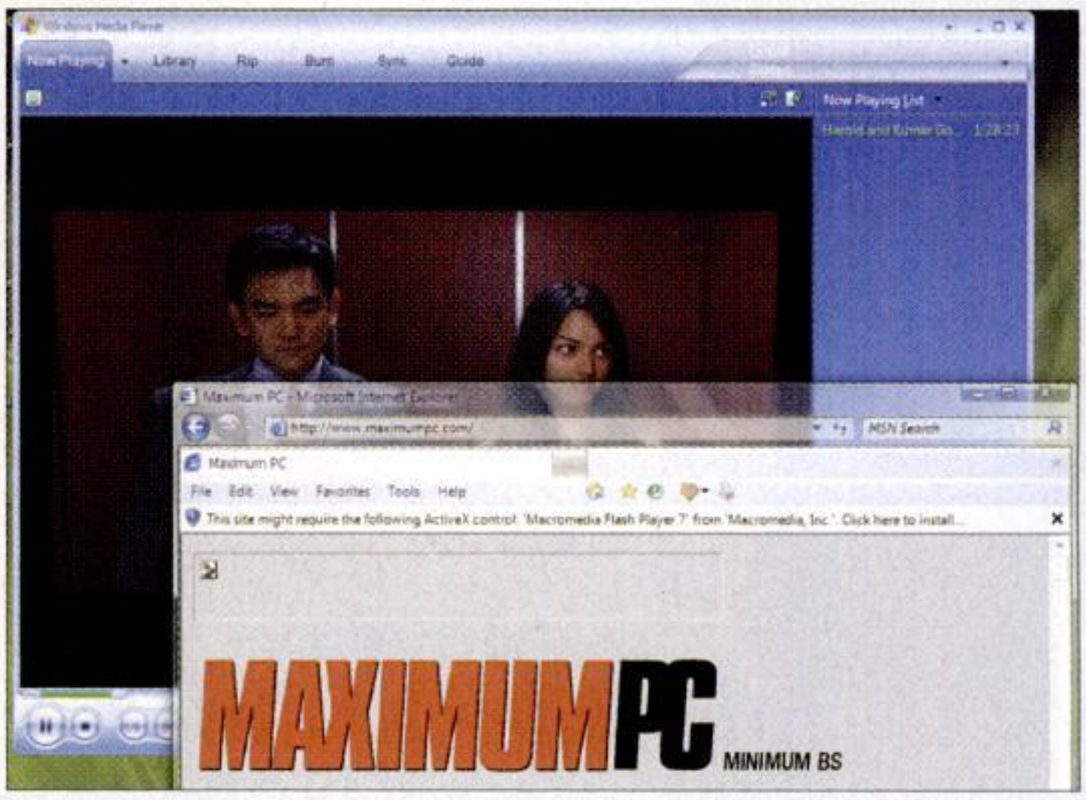
Microsoft added tons of new functionality to the underpinnings of the OS in order to keep Vista running at full speed despite increased hardware requirements

Sometimes you just have to start over and do it the right way. That's what Apple did with OS X, and it's paid off in huge performance and reliability dividends. Although there aren't any insurmountable flaws in Windows XP, there's tons of legacy code designed to support applications that date back to a time before the Internet. With Vista, Microsoft is letting go of much of the legacy past, and we salute that.

LONGHORN DISPLAY DRIVER MODEL

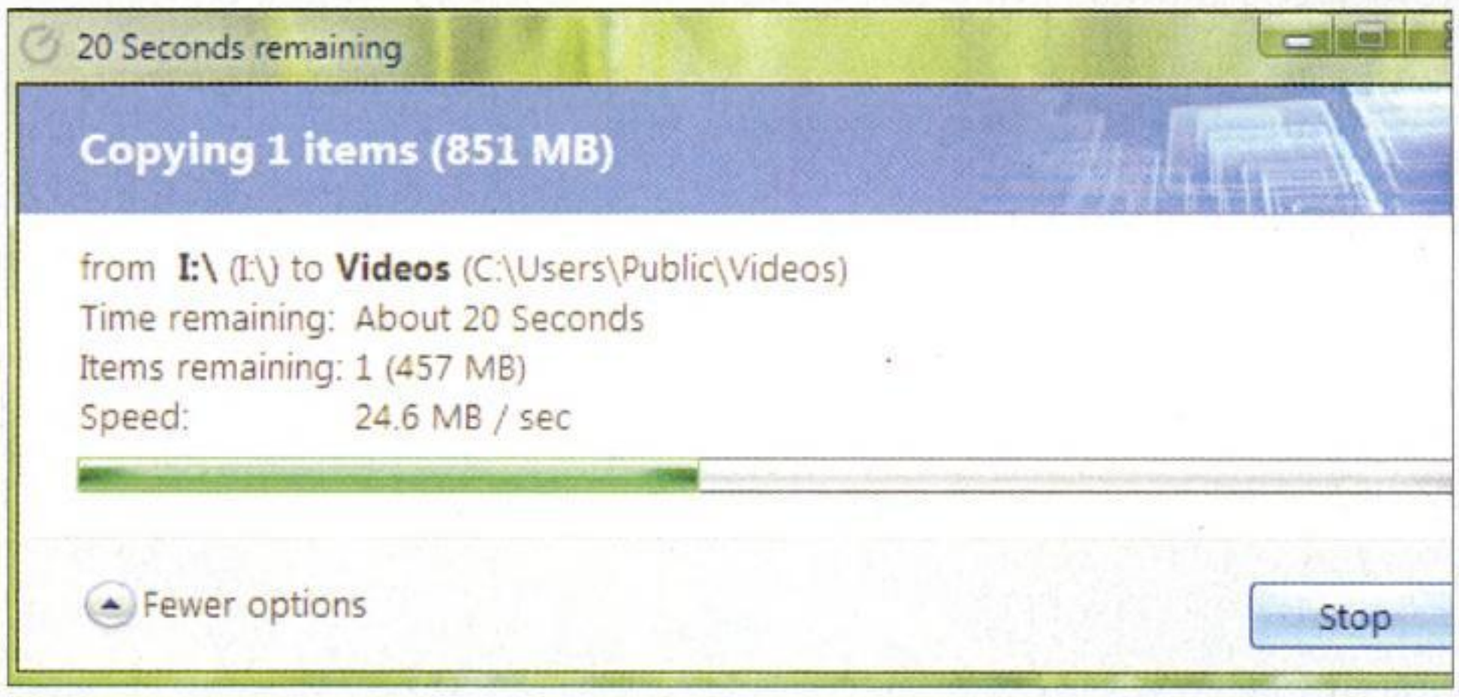
The biggest news in Vista is its departure from the GDI—the Graphical Device Interface—which has drawn everything on your Windows desktop since Windows 3.0. Replacing it is the Longhorn Display Driver Model (LDDM), which will almost certainly receive a new name before launch.

The LDDM is necessary to the transition from a 2D bitmap-based desktop renderer to Vista's vector-based 3D-rendered desktop—named Aero. Moving to a vector-based desktop is a good thing. Because vector-based images describe the shape of onscreen objects using math instead of simply placing pixels, everything Vista displays will be infinitely resizable. That's great for resizing windows, but it's even more helpful when you pair it with displays that sport greater than normal DPI. Instead of using an interpolation method to describe the extra pixels, Vista can simply calculate the extra pixels that should be present. The resulting image will be crisper and cleaner.



Vista's new user interface, Aero, uses the LDDM to draw transparent borders around every window in real time.

So what about legacy content that requires GDI? It's easy: Vista emulates the GDI, draws the contents of the legacy app's window off-screen, then writes that render to a texture and applies it to the visible window. Microsoft claims there's a slight, but unnoticeable performance hit. Our testing with legacy GDI apps backs that up.


20 Seconds remaining
Copying 1 items (851 MB)
from I:\ (I:\) to Videos (C:\Users\Public\Videos)
Time remaining: About 20 Seconds
Items remaining: 1 (457 MB)
Speed: 24.6 MB / sec
Fewer options
Stop

We're not sure exactly what the Vista team had to do to pull this off, but the Time Remaining bar is actually accurate in Beta 1. We timed it!

DIRECTX 10

Rumors of Direct X's demise have been greatly exaggerated. Along with the introduction of the LDDM, Vista will also feature DirectX 10, a new, updated version of Direct3D that doesn't include a lot of the legacy cruft.

Let's talk about the removed or deprecated APIs first. DirectInput, DirectPlay, and DirectMusic won't appear in Vista. DirectInput has been supplanted by a new API designed for the Universal

What about 64-Bit Vista?

Despite a rumored "both versions in the box" launch strategy, the current word on the street is that the 64-bit version of Windows Vista will be packaged separately from the 32-bit edition.

By the end of 2006, when we expect Vista to ship, every shipping CPU should support the AMD64 extensions, and be capable of running the 64-bit version of the OS. But because Microsoft plans to ship the two versions separately, we expect that a relatively small number of people will actually take advantage of the 64-bit edition. Without lots of folks using 64-bit Vista, it's unlikely that smaller hardware manufacturers will ship 64-bit Vista drivers, leaving 64-bit users outta luck when it comes to connecting printers, RAID cards, and other devices. That's just no good.

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Controller—the shared Xbox 360 and PC gamepad—as well as the basic Windows mouse- and keyboard-input APIs. DirectPlay is no longer necessary. It was originally designed for peer-to-peer gaming over a serial connection, and most multiplayer games today use more common Internet protocols. DirectMusic, which was used to create dynamic MIDI-based music in games, never really took off, and is being removed.

The biggest addition to DirectX 10 is support for geometry-shader programs. The geometry-shader units will sit in the rendering pipeline between the vertex shader and the pixel shader, and allow programmatic manipulation of every vertex rendered. The geometry shader lets developers manipulate primitives (connected groups of triangles that make up more advanced shapes) using shader programs. This should help alleviate memory-bandwidth bottlenecks, especially when rendering things like fur, hair, and shadow volumes.

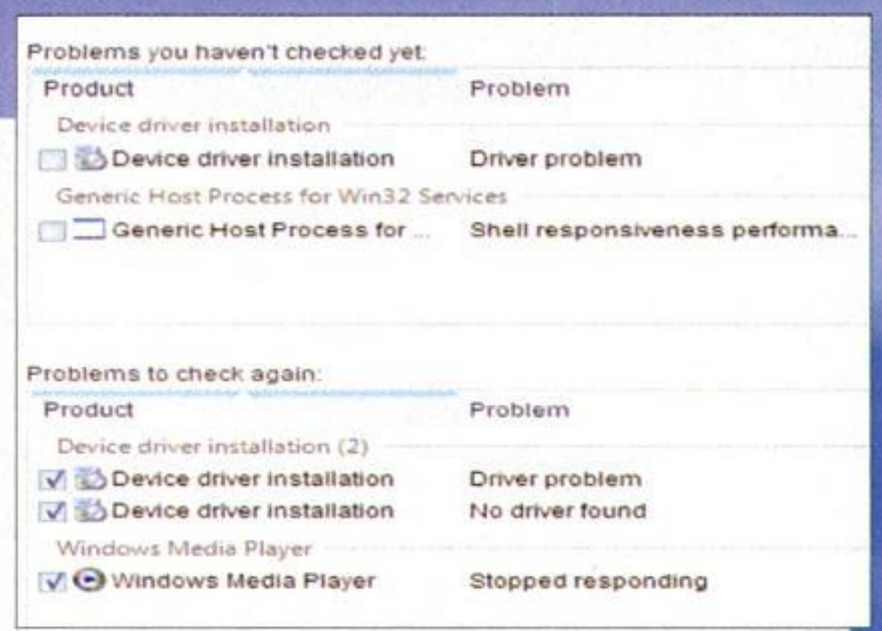
We're especially excited about Microsoft's promise to lay out an extremely specific set of hardware requirements, which must be met for a GPU to be considered DirectX 10-compliant. Unlike DirectX 9, DX10 cards will sport consistent bit depths and share a common base level of functionality.

WINSAT

The last thing anyone wants is a laggy 3D interface, which is a possibility now that drawing your desktop will be dependant on the performance of your 3D card. To prevent the Aero interface from being a negative rather than a positive, Microsoft has implemented performance instrumentation throughout the OS. In Vista, the WinSAT system measures tons of performance indices, from the time it takes your system to boot, to the time it takes to open the Start Menu, to the time it takes to resize windows.

Of course, measuring performance doesn't do any good if WinSAT doesn't help end users track down the problem and fix it. When you first boot your Vista rig, WinSAT benchmarks the entire system, and saves those numbers. If WinSAT detects a performance dip in any of its tests later on, it's smart enough to associate that slowdown with other changes to the system, such as software installs or driver updates, and provide the user with possible solutions.

In order to keep your operating system minty fresh, Vista automatically measures the performance of crucial Windows tasks. Should your perf numbers drop too low, the WinSAT will first let you know there's a problem, then give you several possible solutions to fix your problem.



ODDS AND ENDS

DRM TECHNOLOGIES

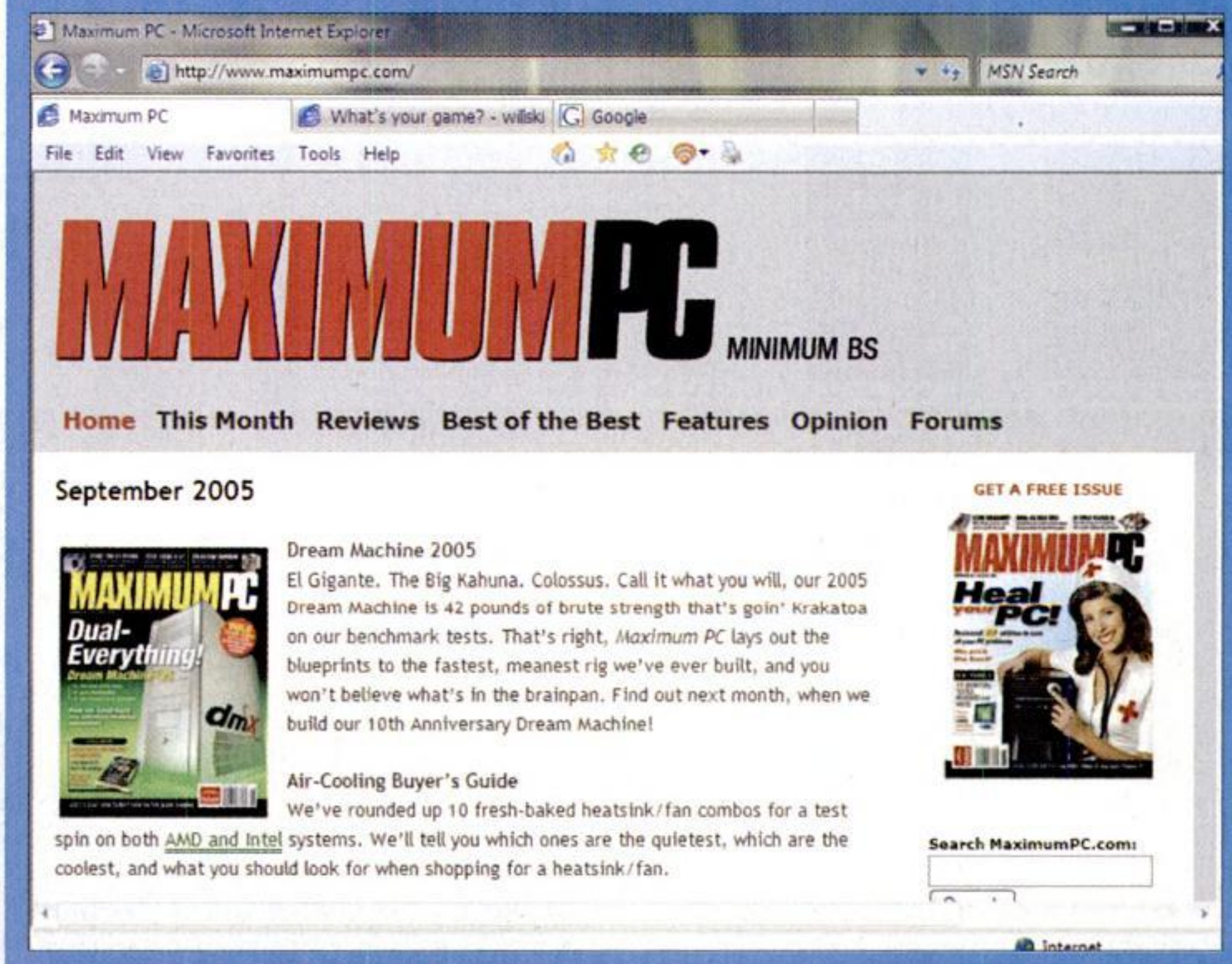
Vista will be the first version of Windows to ship with integrated hardware DRM technology, although Microsoft still claims it will be an opt-in "feature." Hardware-based DRM is not something we're happy about. Quite frankly, we don't appreciate anyone locking our data in a box for us, and not giving us the keys. As Vista is still more than a year out, and the Palladium-based tech isn't fully implemented yet, it's tough to say what the impact will be. We'll keep you posted as more details emerge.

INTERNET EXPLORER 7

Beta 1 of Vista also includes the first beta of *IE7*. We've not spent enough time to pass judgment yet, but it's certainly promising. In addition to some must-have features, namely tabs, there's also a nifty anti-phishing feature. When users suspect that a site is a phishing site, they press a button. That URL is then sent to a central server, and when enough users label it as a phishing site, all visitors using *IE7* receive a warning.

AERO GLASS

We didn't forget about the most exciting new tech in Vista, we've devoted an entire page to it. Turn the page for a closer look at Aero Glass, Vista's new 3D-accelerated UI.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Vista Beta 1 also includes the first beta of *Internet Explorer 7*. Key additions include anti-phishing tech, RSS support, and *Firefox*-style tabbed browsing.

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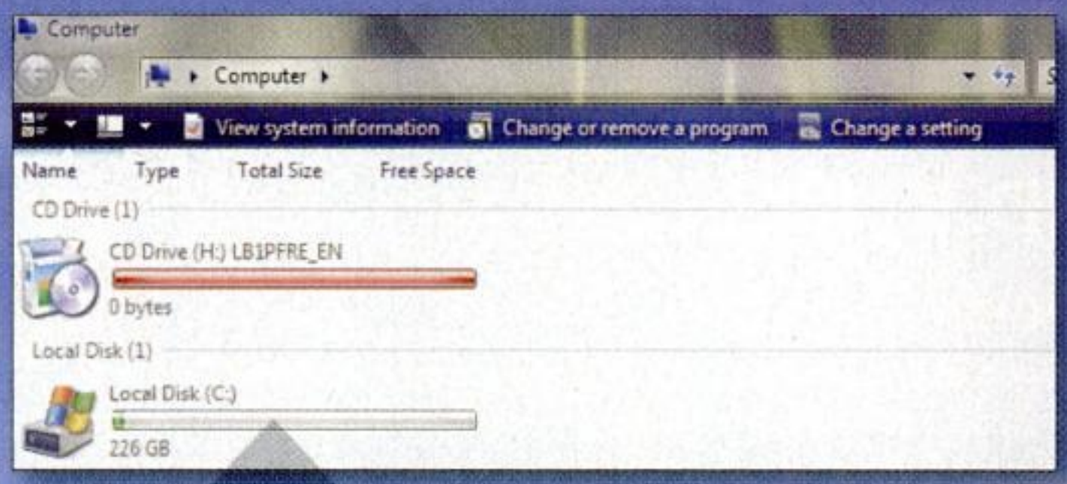
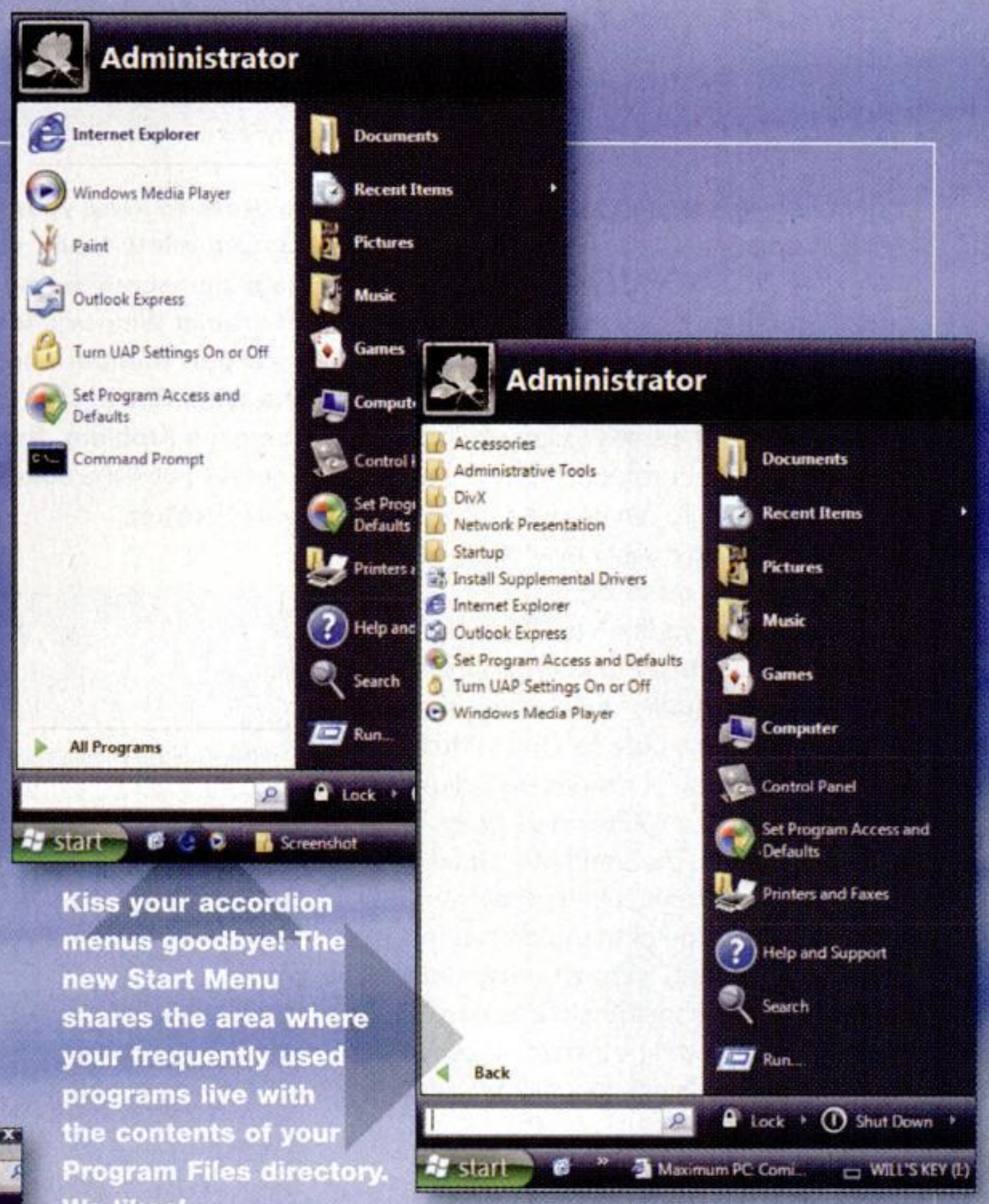
Windows VISTA Comes Together

Eye Candy

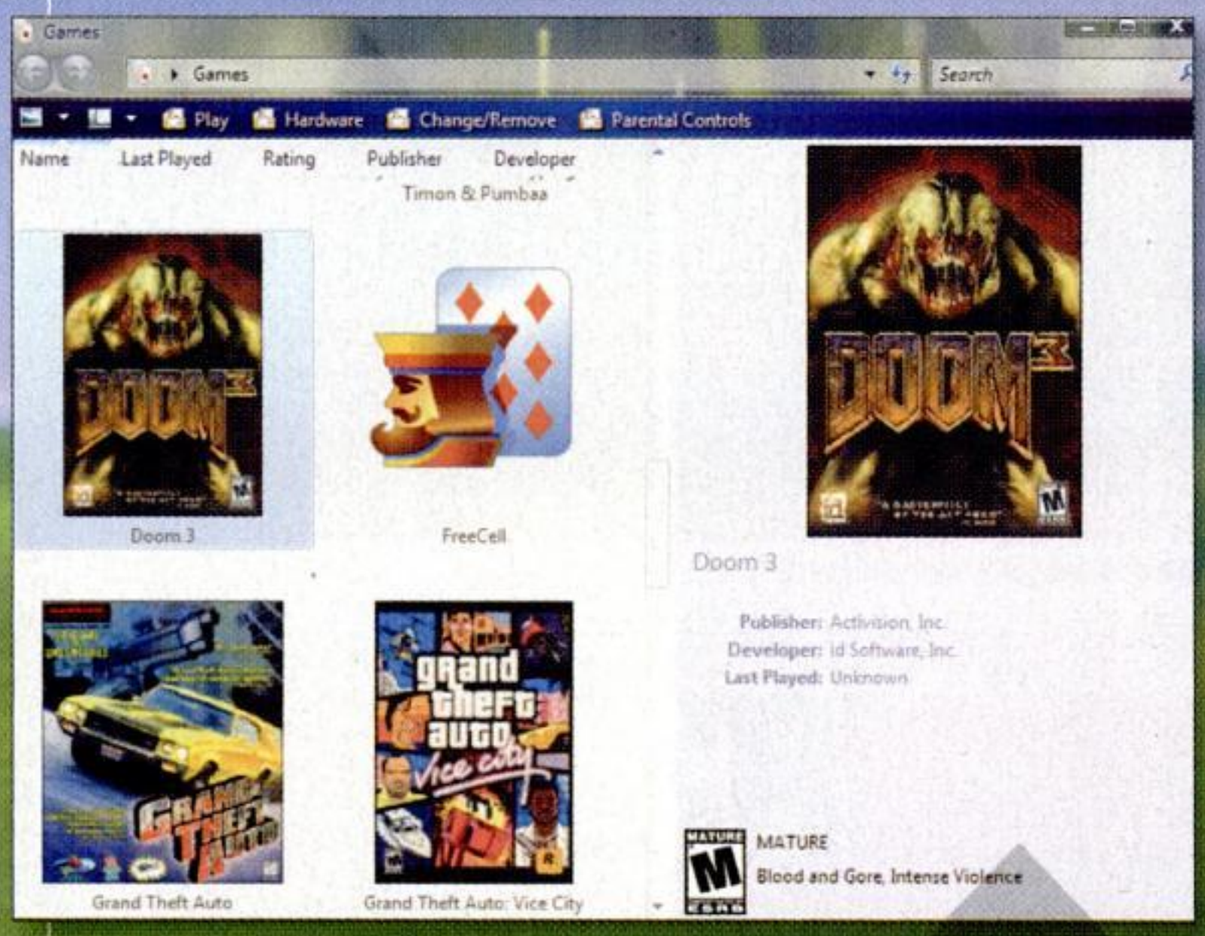
A picture truly is worth 1,000 words. These shots of the Aero interface reveal the building blocks from which Vista is built



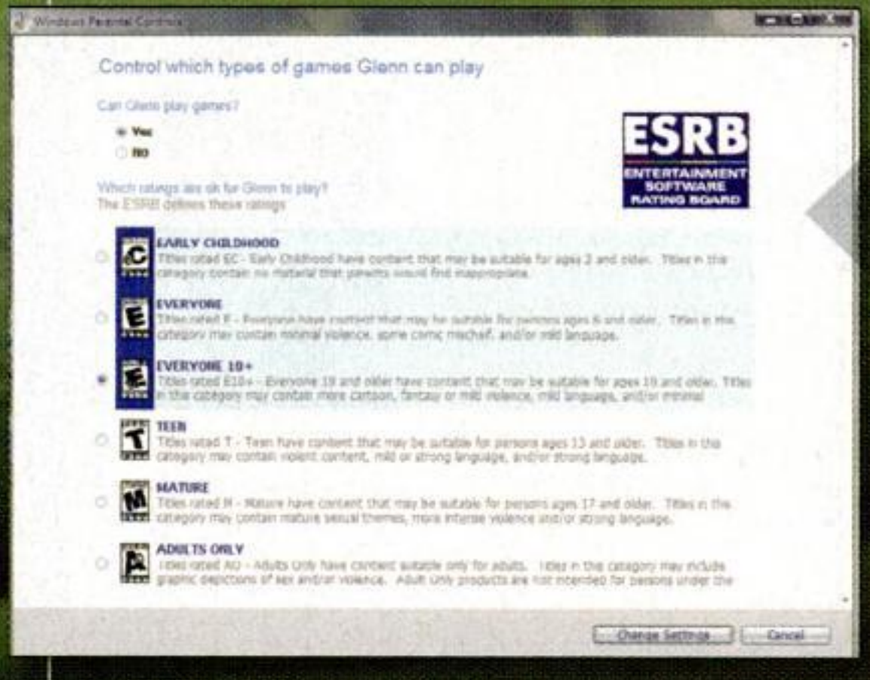
The new Computer window (sans the vestigial "My") includes a graphical representation of free space on all of your drives. The traditional File/Edit/View menus have also been replaced by a series of graphical menus (in the purple bar).



Kiss your accordion menus goodbye! The new Start Menu shares the area where your frequently used programs live with the contents of your Program Files directory. We likee!



The new Games interface will not only automatically keep your games up to date, it also includes parental controls that are enforced by the OS. If you don't want Junior playing *GTA*, he won't even see the directory where it is stored on your system.



The new design for the Control Panel looks nice and seems clever, but in practice it doesn't work very well. We'll stick to Classic View, thank you very much.

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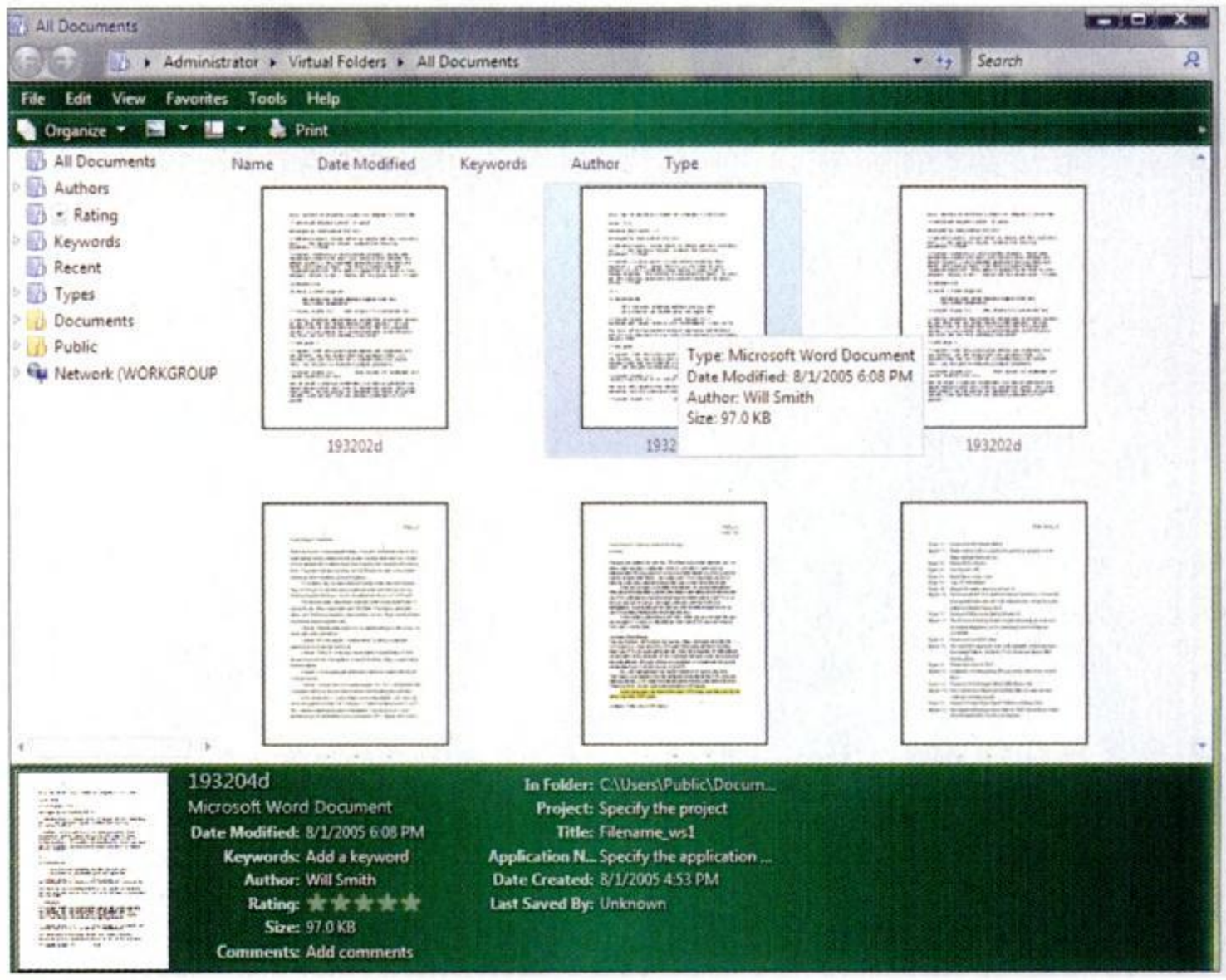
Usability Enhancements

Without new additions that let you use your computer more efficiently, all the eye candy in Vista is worthless. The majority of usability enhancements will come with Beta 2, but here's a look what's new in Beta 1

To make Windows easier to use, and make every second spent with your computer more efficient, Vista includes a ton of improvements in raw usability. Everything from the built-in search engine to the all-new document-browsing interface will make it easier to get your work done, so you can get back to using your PC for fun.

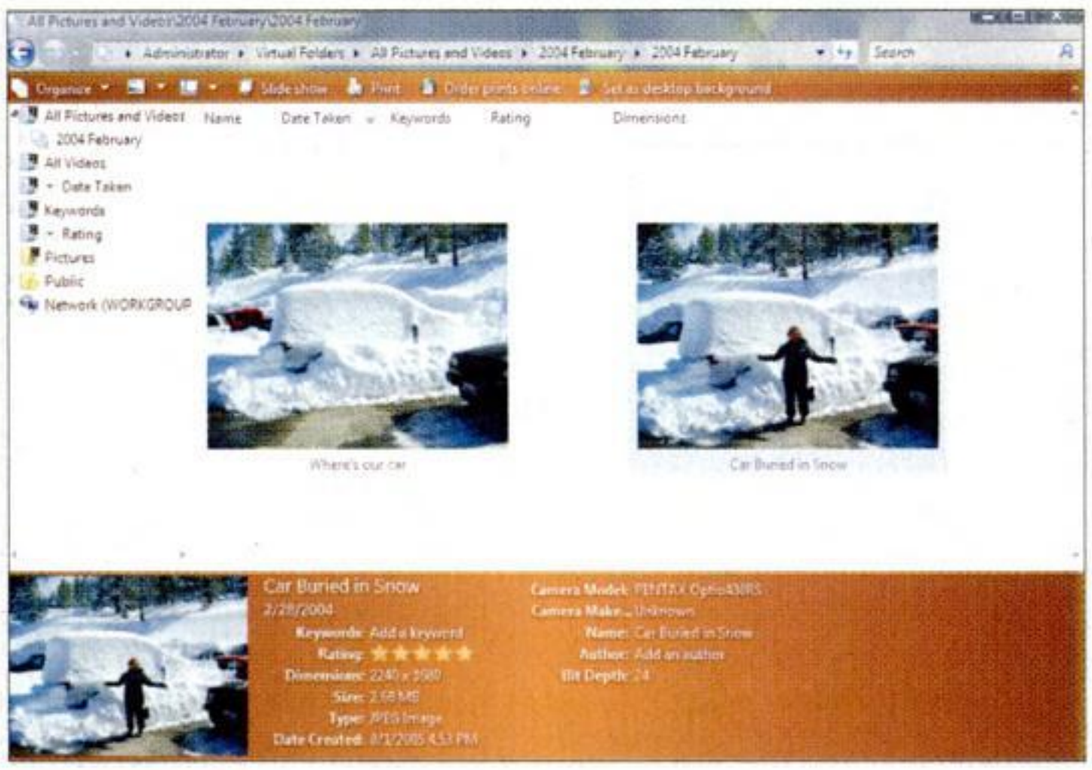


The new Aero-ized Documents virtual folder will pull all the work documents you have on your system into one easy-to-work-with area, and even shows thumbnails of the pages!

DOCUMENTS

We've already touched on Aero, but it's important to realize the impact of the vector-based renderer. Because onscreen components scale infinitely in either direction, the OS can effortlessly create thumbnail images of every document, which will serve as the document icon. Just as with OS X, you can scale your icons from very small size to massive. The difference is that on Vista, the icons look crisp and clear at all sizes.

To clarify, we're not just talking about photos, we're talking about *Word* documents, PDF files, HTML files, and video files. (All of you folks that have 20 documents named "New Text Document.txt" on your Desktop will dig this feature.)



Your photos also get the Aero treatment. You can resize thumbnails from icon-size to nearly full-screen by moving a slider.

MODERN SEARCHING

The search in Windows XP sucks. It's slow, inaccurate, and the only "advanced" feature is that useless dog. The first thing most power users do is disable the default XP search and use the Windows 2000-style one instead, but that still doesn't fix the underlying problem. Even if you index the contents of your drive, it's still painfully slow and searches only file names by default.

Vista's new search is Google-fast, and searches damn near everything on the hard drive. Search looks deep into the files stored on your hard drive. It indexes the contents of all of your documents, the metadata in movies and pictures, and even your email messages. Type in "Bob Johnson" and you'll see every email between you and Bob, all the documents that reference Bob or were written by him, and all the photos he's taken and sent you, all in a split second.

With the full-speed search in place, we're not sure what to expect from the delayed WinFS subsystem (WinFS will ship shortly after the initial release of Vista).

PORTABLE PROFILES

Many homes these days include multiple computers networked together. But switching between PCs can be a real nightmare, with different bookmarks, email, and game saves on every machine. These problems will be a thing of the past with Vista's new profile-sharing feature.

Once you establish a relationship between your Vista computers, the OS will transparently sync the contents of your profile directory with all the other computers. Everything saved in your "Documents and Settings/User" folder—saved games, pictures, music, email, bookmarks, and documents—will be accessible when you log on to any computer in your home.

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Security Info

Here's how Vista will fix the growing problem of malware

Spyware, viruses, and other apps that embed themselves so thoroughly in the innards of Windows that they're virtually impossible to get rid are a huge problem in Windows XP. Users everywhere are frustrated, and people have even begun to believe there's nothing that can be done about the erratic behavior caused by spyware. That's not the way it should be. One of the main goals of Vista is to curb the spread of malware, and there's a lot of behind-the-scenes stuff in the new OS that makes that possible.

FIREWALL

The firewall included with Windows XP SP2 filters only incoming traffic, which is a good start. But one of the easiest ways to tell whether your machine is infested with malware is to monitor outbound traffic. That's what Vista's firewall does, and we're glad it's turned on by default.

What does that mean for the user? When an app attempts to connect to the Internet, whether to send data or simply to listen for incoming traffic, you'll receive a prompt asking if you want to allow the connection, deny the connection, or always allow the connection. The XP SP2 firewall asks only if your app is trying to listen for incoming traffic.

VIRTUALIZED PROGRAM FILES

What about apps that won't behave well with limited-user accounts? Vista will create a virtual Program Files and Registry inside the user's profile. To the app, the virtualized areas will be indistinguishable from the "real" Registry and Program Files directory. But because they're in the user's profile directory, the app can modify whatever areas it chooses, without any pesky permissions problems.

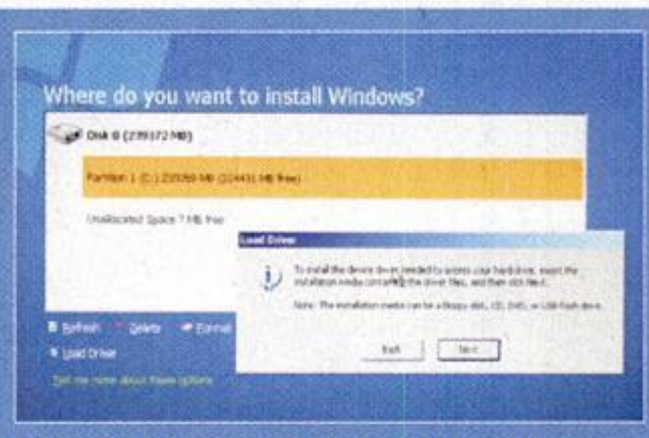
Of course, there's a downside. Any legacy app you install in the virtualized area is only accessible to that user account. If, let's say, *GTA: San Andreas* were a legacy app (it's not), and both you and your roommate wanted to play, you'd have to install it twice, and that would eat almost 10GB of hard drive space. Still, we'd rather suffer dual-installs of a few legacy apps than face another 10 years of inadvertent *CoolWWWSearch* infections.

Windows Security
Windows is helping make your computer secure by asking for your permission before making changes that require administrator rights.
Do you want to turn off this security feature?
Yes
No
If you choose yes, Windows will no longer prompt you for administrator password before you make changes that require administrator privileges. How does this make my computer less secure?

User Access Protection requires you to enter your password when you make a potentially dangerous change to your system, even if you have admin rights.

INSTALL FROM AN IMAGE

Perhaps our favorite feature in Vista is the new image-based installer. The installer dumps an unspoiled disc image on the hard drive after a brief preinstall process, then the OS boots and does Plug and Play hardware recognition. The best part of this? You don't need to press F6 to install third-party storage drivers off a floppy disc. Instead, you can plug a USB key or CD-ROM containing the driver into your rig, and kiss the floppy goodbye forever.



It's not security related, but not having to use floppy disks to install mass storage drivers will keep us from going postal and blowing up the place. Don't you feel safer?

Limited Accounts

The default permissions assigned to all users present the biggest security problem with Windows XP. Instead of encouraging users to run as limited users—users only able to access data in their directories and run apps, but not add or remove software or drivers—XP hands every user admin privileges by default. That means that every application an admin-enabled user runs, like a web browser, also has admin privileges. Should a user click a virus attachment or spyware installer, there's nothing stopping that app from installing and insinuating itself deep in Windows.

Even if you want to run Windows XP as a limited user, it's virtually impossible if you regularly play games.

One of Microsoft's main goals with Vista is to fix the limited-user account problem. Vista also allows you to temporarily switch to an admin-level account to install apps or upgrade drivers, then switch back to a limited-user account when the task is done. XP doesn't do that. MPC

Anytime a limited user attempts to do anything that could compromise the system, he'll have to log on with admin privileges.

More Vista Coverage!

We're not done yet. Expect another in-depth look at Windows Vista around the time Beta 2 ships—toward the end of 2005. As always, stay tuned to *Maximum PC* for all things Windows!

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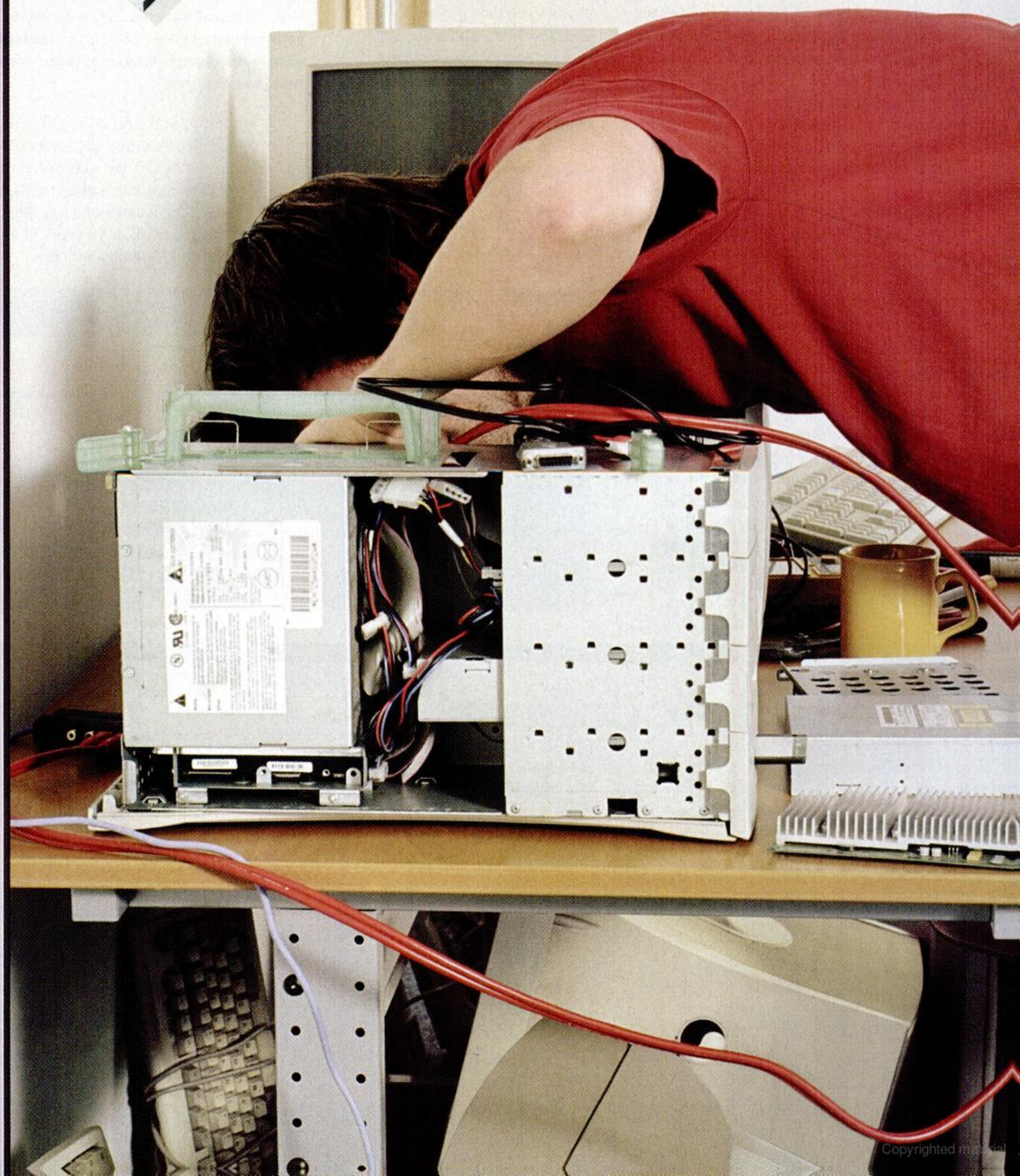

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VENDORAMA

Don't cripple your fast rig with insufficient short-term memory: Here's everything you need to know about buying the right kind of RAM

—BY MARK SOPER

As operating systems and applications get more powerful (and more bloated), your PC's memory grows ever more important. Adding more memory—also called RAM—to your rig is the most cost-effective way to improve performance.

STOP! Before you place your RAM order, you need some key questions answered. We'll tell you why having more RAM boosts performance, what type of RAM works with your motherboard and processor, how much RAM you need to improve system performance, how to install it, and where you can get "tricked out" RAM that combines visual appeal and top-drawer performance. We'll lead you through the tangles of memory terminology to a faster system.

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UNDERSTAND YOUR RAM

RAM stands for "random access memory." Your computer uses RAM as a temporary workspace. The CPU transfers data and applications from long-term storage devices (your hard drive and optical drive) into RAM, then runs the programs and accesses data from memory. New data is created within your system memory before it's ever saved to a storage device. Every byte of information used by a PC during its operation flows through RAM on its way to or from an I/O device, the CPU, or a storage device.

Access to data in RAM is immediate: The CPU can read or write to any location in memory without having to muddle through the adjoining data.

Most RAM used in PCs today is dynamic RAM, or DRAM. It's called "dynamic" because the memory chips must receive new electrical charges (a process known as memory refreshing) thousands of times a second, or the data stored in the chips is lost. This is why information saved only in RAM is lost as soon as your PC is restarted or turned off.

RAM AND PAGING FILES

If a program or data file is too large to completely reside in RAM, PCs use dedicated areas of the hard disk to store the overflow. This dedicated disk space is known as "virtual memory." The paging file (swapfile) in Windows is an example of virtual memory. Windows uses the paging file as a holding tank for information being transferred in and out of your system RAM. The less RAM you have, the more frequently your paging file is used.

Although a paging file enables a system with a relatively small amount of memory to work with files that exceed the amount of available physical memory, using the paging file instead of physical memory has a huge negative impact on performance. Hard drives move data an order of magnitude slower than even the slowest RAM.

This means that the more memory you add to your system, the greater the number of programs you can run, and your system can work with larger files before resorting to the paging file. In an ideal situation, the paging file would never be used. In practical terms, you want to install enough memory to handle the largest amount of work (or play) your PC performs on a routine basis. Check out our benchmarks on page 41 to see how different amounts of RAM can affect system performance in applications and games.

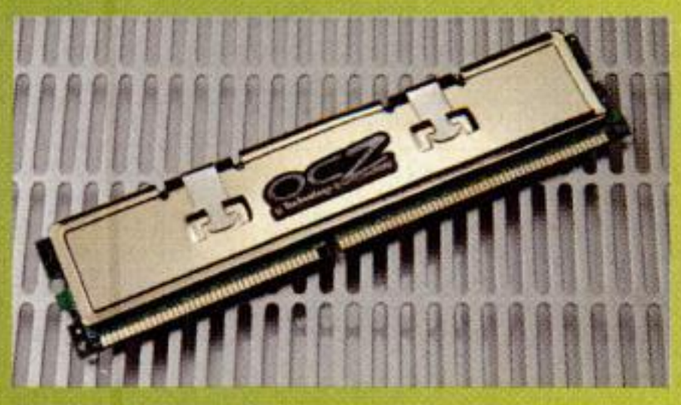
RAM TODAY'S WAY

There are two types of RAM used in today's PCs: DDR (double data-rate) and DDR2 (second-generation DDR). These memory types are usually synchronized to the processor's front-side bus (FSB) speed, as was their ancestor, SDRAM memory. Both DDR and DDR2 provide faster performance than SDRAM because they run at much higher clock speeds, and transfer twice the amount of data every clock cycle as vanilla SDRAM was capable of. Despite the similar names, DDR and DDR2 are not compatible with each other and cannot be interchanged.

UNDERSTANDING DDR NOMENCLATURE

The naming scheme for DDR memory can be very confusing. How do you know if you have DDR400, 200MHz DDR memory, or PC3200 DDR SDRAM? The trick is, it's all the same memory. Because DDR400 runs at a clock speed of 200MHz but makes two reads or writes per clock cycle, the effective speed of the memory is 400MHz. People also refer to DDR memory by its throughput. For example, DDR400 memory has a maximum throughput of 3,200MB/s, so memory modules using DDR400 RAM are also called PC3200 modules. The most common DDR memory speeds are shown in Table 1 on the following page. Speeds above PC4000 are used primarily by extremely high-performance, overclocked systems.

Aside from the PC rating, the other factor that's important when you select DDR memory is the rated CAS (column, address, strobe) latency. CAS latency (often abbreviated as CL) refers to the number of clock cycles needed to access the memory. Most DDR memory has a CL rating of 2.5 or 3. Lower-latency modules running at the same clock speed as higher-latency modules provide faster memory access.



OCZ EL Titanium modules feature titanium-plated copper heat spreaders, low latencies, overvoltage protection, noise reduction, and capacities of 512MB and 1GB in both DDR and DDR2 varieties.

Mushkin Extreme Performance DDR modules include a black six-layer PCB, integrated heat spreaders, and very low latencies. www.mushkin.com

Kingston's HyperX memory features low latencies and blue heat spreaders marked with the famous "red head" Kingston logo and. www.kingston.com

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DDR VS. DDR2: HOW DO THEY COMPARE?

The latest Intel chipsets for the Pentium 4 use DDR2 memory—second-generation DDR memory. Compared with DDR memory, DDR2 runs at lower voltages to reduce heat, boasts larger-capacity chips to permit higher memory capacities per DIMM module, and uses other design tricks to run at faster clock speeds, as shown in Table 2. However, as DDR2 memory speeds increase, their latency also goes up. Thus, you shouldn't expect a DDR2 system running PC2-3200 (DDR2 400) to be much faster than a comparably equipped system running PC3200 (DDR400) memory. The true benefits of DDR2's comparably higher clock-speeds won't begin to show up until motherboards that can accommodate higher clock speeds start shipping.

TABLE 1: COMMON DDR MEMORY SPEEDS

PC RATING	THROUGHPUT	DDR RATING (EFFECTIVE CLOCK SPEED)	ACTUAL CLOCK SPEED
PC1600	1.6GB/s	DDR200	100MHz
PC2100	2.1GB/s	DDR266	133MHz
PC2700	2.7GB/s	DDR333	166MHz
PC3200	3.2GB/s	DDR400	200MHz
PC3700	3.7GB/s	DDR466	233MHz
PC4000	4.0GB/s	DDR500	250MHz
PC4400	4.4GB/s	DDR550	275MHz
PC4800	4.8GB/s	DDR600	300MHz
PC5600	5.6GB/s	DDR700	350MHz

TABLE 2: COMMON DDR2 MEMORY SPEEDS

PC RATING	THROUGHPUT	DDR2 RATING (EFFECTIVE CLOCK SPEED)	ACTUAL CLOCK SPEED
PC2-3200	3.2GB/s	DDR2 400	200MHz
PC2-4300	4.2GB/s	DDR2 533	266MHz
PC2-5400	5.6GB/s	DDR2 667	333MHz
PC2-6400	6.4GB/s	DDR2 800	400MHz

THE COMPLETE GUIDE TO CHOOSING THE RIGHT RAM

Maybe you don't want to know the details—you just want to find out what kind of RAM you need and get on with your life. Here's a handy guide to pairing the correct type of RAM with your motherboard and chipset.

PENTIUM 4 RAM GUIDE

SOCKET TYPE	CHIPSET	MEMORY
INTEL CHIPSETS		
Socket 423	850, 850E	Rambus RDRAM
Socket 478	845, 845G, 845GV, 845GL	PC-133 SDRAM or DDR PC2100/PC1600*
	845GV	PC-133 SDRAM or DDR PC2700/2100/1600*
	845GE, 845PE	DDR PC2700/2100
	848P	DDR PC3200/2700/2100
	865G, 865PE, 865GV	Dual-channel DDR PC3200/2700/2100
	865P	Dual-channel DDR PC2700/2100
	875P	Dual-channel DDR PC3200/2700/2100
Socket 478, Socket 775	910GL	Dual-channel DDR PC3200/2700
Socket 775	915GL	Dual-channel DDR PC3200/2700
	915GV, 915P, 915G	Dual-channel DDR PC3200/2700 or dual-channel DDR2 PC-4200/3200*
	925X, 925XE	Dual-channel DDR2 PC-4200/3200
	915PL	DDR PC3200/2700
	955X	Dual-channel DDR2 PC2-5300/4200
VIA CHIPSETS		
Socket 478	P4X266, P4X266E, P4M266	PC-133/100 SDRAM or DDR PC2100/1600*
	ProSavage P4M266	DDR PC2700/2100
	P4X400	DDR PC2700/2100/1600
	PM800	DDR PC3200/2700/2100
Socket 478, Socket 775	PT880 Pro, PT880 Ultra, PT894, PT894 Pro	Dual-channel DDR PC3200/2700/2100 or dual-channel DDR2 PC-4200/3200*
	P4M800 Pro	DDR PC3200/2700/2100 or DDR2 PC2-4200/3200*
NVIDIA CHIPSET		
Socket 775	nForce4 SLI Intel Edition	Dual-channel DDR2 PC2-5300/4200/3200

Check motherboard to determine which memory type your system supports. You can also use system-analysis programs such as SiSoftware Sandra 2005 Lite (www.sisoftware.co.uk/) to determine this information.

ATHLON XP RAM GUIDE

ATHLON XP MODEL NUMBER	PROCESSOR FSB	MEMORY
1500+ 1600+ 1700+ 1800+ 1900+ 2000+ 2100+, 2200+, 2400+, 2600+**	266MHz	DDR PC2100
2500+ 2600+** 2700+ 2800+ 3000+***	333MHz	DDR PC2700
3000+*** 3200+	400MHz FSB	DDR PC3200

***Some 2600+ run at 266MHz FSB, while others run at 333MHz FSB.*
****Some 3000+ run at 333MHz FSB, while others run at 400MHz FSB.*

ATHLON 64 AND FX RAM GUIDE

ATHLON 64/FX SOCKET TYPE	MEMORY
Socket 940	Registered dual-channel DDR PC1600, PC2100, PC3200*
Socket 939	Dual-channel DDR PC1600, PC2100, PC3200*
Socket 754	Single-channel DDR PC1600, PC2100, PC3200*

**Memory configurations might differ with CPU due to on-die memory controller.*

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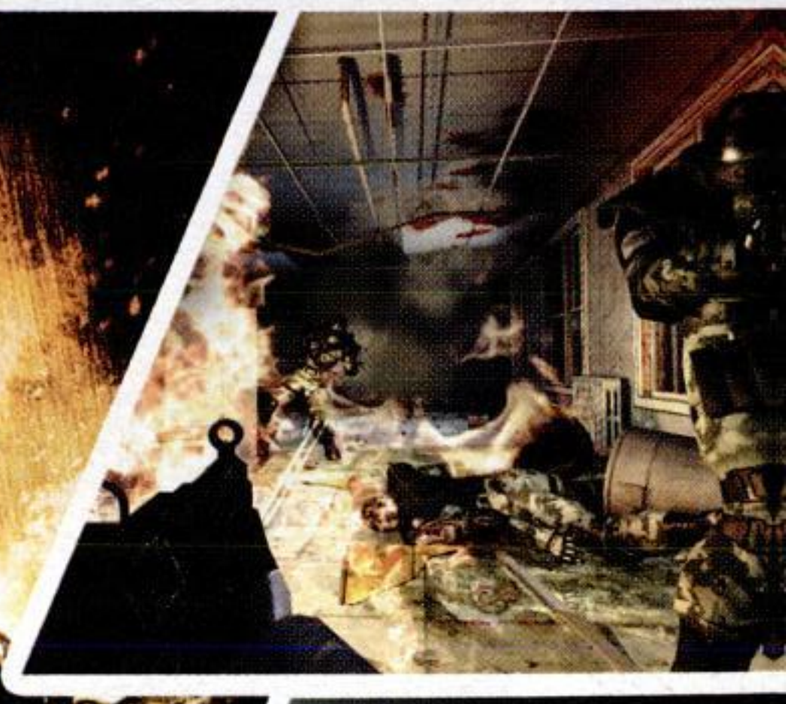

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COMMON QUESTIONS AND ANSWERS

Q *What is the significance of the numbers listed after the model number for a module, such as 3-4-4-8?*

A The first number is the CAS latency (CL), which is the number of clock cycles between the time a read command is sent and the data is available. The second number is the tRCD (row address to column address delay), which is the number of clock cycles between the active command and the read or write command. The third number is the tRP (row precharge time), which is the number of clock cycles between a precharge command and the active command. The fourth number is the tRAS (row active time), the number of clock cycles between a bank active command and a bank recharge command. The standard values for a memory module are stored in its SPD (serial presence detect) chip, and are used by the BIOS when you select "By SPD" or "Auto" for memory timings.

Q *Can I change these values?*

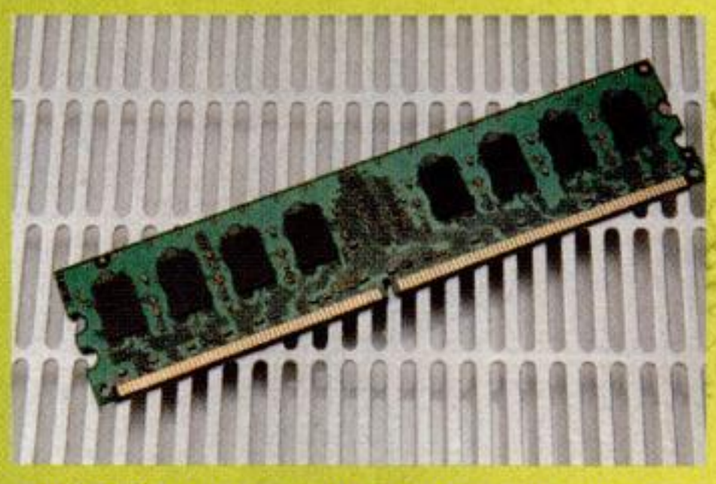
A Most systems permit you to manipulate memory timings. Reducing the tRCD and tRP values can improve memory performance, although you might need to increase the CL value a bit to maintain stability.

Q *Is there really a performance difference between generic, branded, and premium RAM?*

A Differences in performance between generic, branded, and premium RAM are not always easy to quantify. Generally, generic RAM has higher (slower) memory timing than other types, so it's not as adaptable to nonstandard settings. Branded RAM is likely to have lower (faster) memory timings than generic RAM, but its memory timings are usually not as fast as premium RAM. The best premium RAM provides very low memory timings for very fast performance at standard and overclocked settings.

Q *Is it worth the extra expense to buy overclockable memory if I don't intend to overclock it?*

A There's no need to spend the money on memory designed for overclocking unless you plan to overclock it. However, if you've had system lockups after your computer has been turned on for a long time, you might be experiencing memory overheating.



DDR2 RAM uses a ball-grid array to mount the chip to the DIMM for better performance.

One of the benefits of overclock-friendly memory versus standard memory is the presence of heat spreaders (metal plates over the memory to help dissipate heat). Using memory with heat spreaders can help reduce overheating and improve system stability. You don't need to buy new memory, though; you can buy heat spreaders for existing memory from many vendors.

Q *Do I need ECC RAM if I don't have an ECC mobo?*

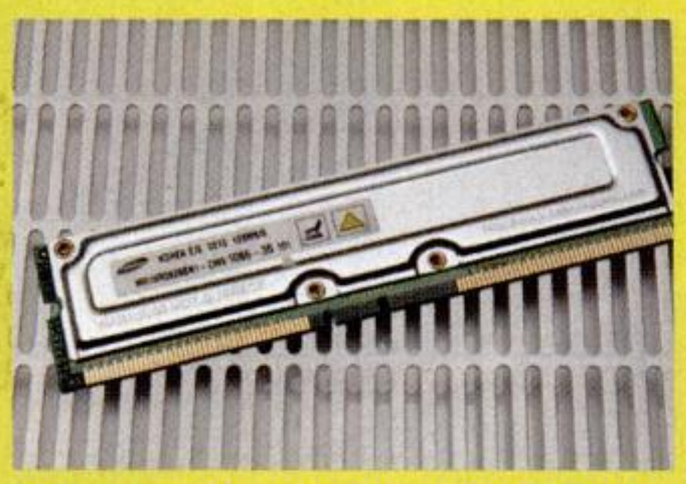
A ECC (error correcting code) RAM is very valuable if you're running a server: It detects and corrects single-bit memory errors. But ECC features work only if your motherboard supports ECC memory. Most motherboards and PC chipsets ignore ECC memory, so unless your system can use it, save your money (ECC costs more than standard memory).

Q *If I want to add to the memory already in my system, do I need to match the exact brand and type?*

A It's not necessary unless you have a dual-channel system and you don't have a matched pair of modules already installed. In that case, you should use a program such as *SiSoftware Sandra 2005 Lite* to find out the size, speed, and memory timings of your existing module and buy a module that matches. If you match memory and timing, brand is unimportant. Then, install the old and new module in the right slots to enable dual-channel memory access. See your motherboard manual for details.

Q *When I add memory to my system, what are the most important specs to look for?*

A ▶ **SPEED** (PC or PC2 rating). This should be the same or faster than your existing memory.



Many early P4 machines used RDRAM, which has all but been abandoned.

▶ **SIZE**. For a single-channel system, buy the largest (in MB) module you can afford. For a dual-channel system, buy a matched set of modules providing the total size you need. For example, two 512MB modules will run faster than a 1GB module on a dual-channel system. If you're upgrading a laptop, you usually only have one memory slot, so fill it with the biggest module available.

▶ **TIMINGS**. If you're a hardcore gamer, you'll probably want to overclock your memory. Look for low-latency memory, and remember to consider all the numbers, not just the CAS latency value.

ADDING MEMORY

How much should you add?

When it comes to adding memory, more is (usually) better. But how much more do you need? Here are some basic guidelines:

▶If you have 256MB or less, upgrade your RAM to at least 512MB, no matter what you're doing. Even if you don't use "power apps" such as imaging, video editing, or heavy 3D gaming, having more memory is beneficial because you can have multiple programs and web browser windows open without slowing your system to a crawl.

▶For a more precise way to calculate how much RAM you need in your work, try this: Load your typical applications and data files, then press Ctrl-Alt-Del to bring up the Task Manager, and click the Performance tab. Take a look at figures for Commit Charge and Physical Memory. If Commit Charge is consistently larger than Total Memory, you could use a memory upgrade.

▶If you're using video or photo-editing programs, 3D modeling programs, or enjoy the latest 3D games such as *Doom 3*, you should have at least 1GB of RAM, and more is even better. See the "Benchmarks" sidebar on the next page for details.

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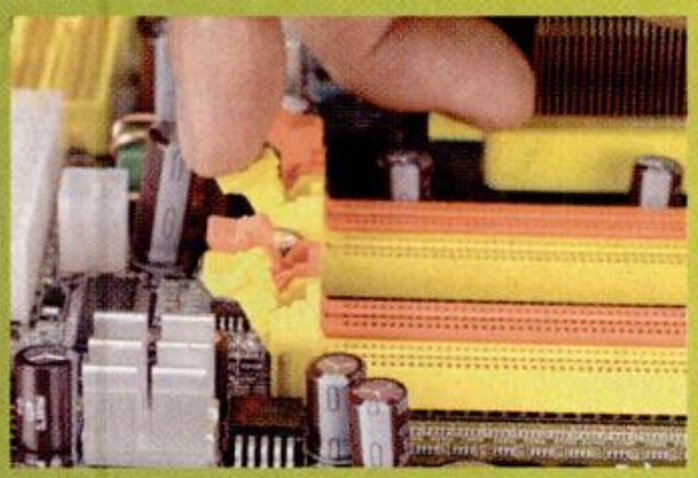
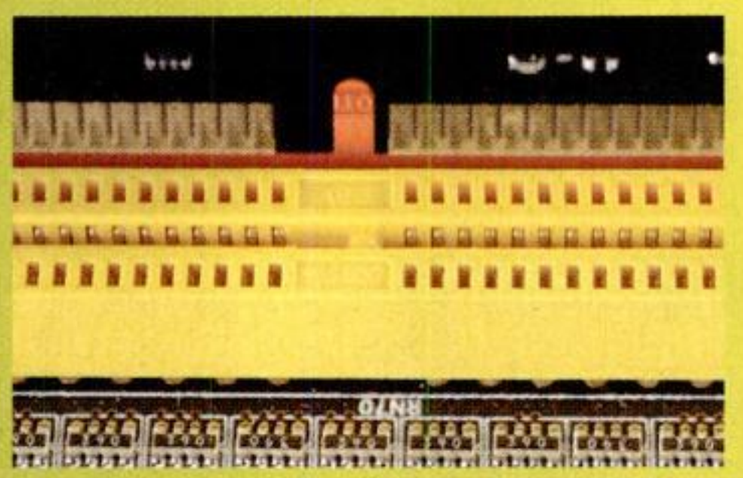
INSTALLING RAM THE RIGHT WAY

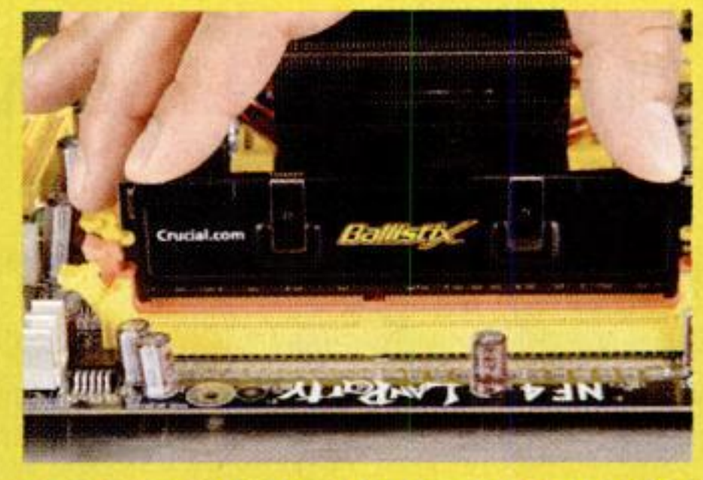
RAM is fragile—not so much physically as electronically. During the installation process, it's essential to protect it from electrostatic discharge (ESD), better known as static electricity. Keep your memory in the antistatic packaging until it's time to install it.



1 Before you remove the memory from its packaging, make sure the memory locking levers are in the open position. You cannot insert memory into a socket if the clips are closed.



2 Before you insert the memory into the socket, make sure the memory is oriented correctly. The notch in the memory must line up with the key in the socket. Slide the memory into the grooves of the locking levers.



3 Some downward pressure is required to install the memory, but don't force the memory too much. The clips should swing from the open to the closed position as the memory is inserted. If the clips do not swing closed as you push the memory into place, the memory is probably not oriented properly.

BENCHMARKS

It's pretty obvious that more RAM will give you more performance—but exactly how much? That's what we set out to find by running benchmarks with 512MB (what we consider to be the absolute minimum for an XP system), 1GB, and 2GB of RAM. All benchmarks were run using an Athlon 64 system with an nForce3 motherboard.

THE BOTTOM LINE

Working with graphics applications, it's clear that the more RAM, the better. With games, however, results are a little more complicated. As you can see from these tests, the amount of memory has a relatively small effect on *Doom 3's* Timedemo benchmark. What appears to have more of an effect is the use of dual-channel memory. Dual-channel memory provides faster memory access than single-channel memory, enabling faster memory performance.

From these benchmarks, we can conclude that gaming systems should have *at least* 1GB of RAM. If your mobo supports dual-channel memory, use it! For example, to upgrade from 256MB to 1GB on a dual-channel system, use a pair of matched 512MB modules rather than a single 1GB module. Finally, if you use your PC for a mixture of productivity and creativity apps as well as gaming, increasing memory above 512MB will get your work done faster—so there's more time for play! MPC

GRAPHICS BENCHMARK

PHOTOSHOP CS2, MAXIMUM PC SCRIPT, 1280X1024 RESOLUTION, 32-BIT COLOR	
512MB (single channel)	358 seconds
1GB (dual channel)	307 seconds
2GB (dual channel)	274 seconds

GAMING BENCHMARK

DOOM 3 V1.1 1600X1200, 4X AA, 4X ANISOTROPIC FILTERING, HIGH QUALITY, TIME DEMO DEMO1	
512MB (single channel)	41 fps
1GB (dual channel)	45 fps
2GB (dual channel)	45 fps

BLING-BLING

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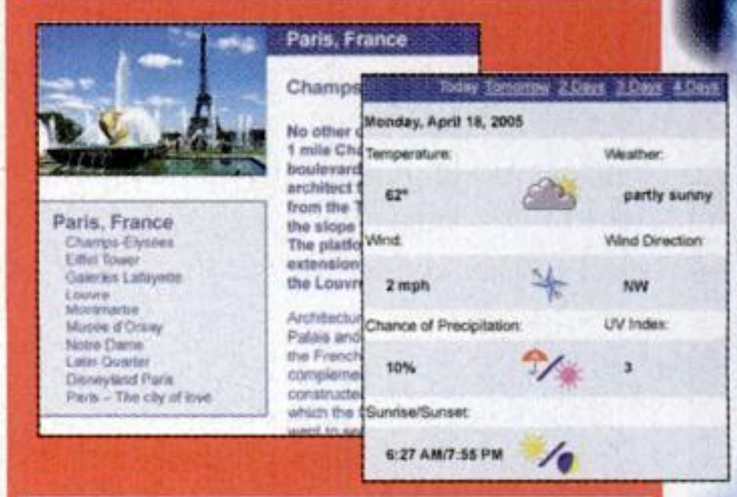

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PDF2Web Converter	✓	✓
DynamicSiteCreator	✓	✓
Graphic archive	✓	✓
Software suite worth $600	✓	✓
FrontPage extensions	✓	✓
CGI library	✓	✓
Active Server Pages	–	✓
DOMAIN NAMES		
Included Domains	1	1
Subdomains	10	10
Run multiple independent sites	✓	✓
Full DNS management	✓	✓
E-MAIL		
E-mail accounts, 1 GB space each	200	200
Aliases, auto-responders, forwarding	✓	✓
1&1 WebMail	✓	✓
Spam filtering for all accounts	✓	✓
Virus protection for all accounts	✓	✓
SECURITY FEATURES		
Protected by up-to-date firewall	✓	✓
Daily backups	✓	✓
Password protected directories	✓	✓
Dedicated SSL Certificate	optional	optional
SUPPORT		
24/7 phone support	✓	✓
24/7 e-mail support	✓	✓

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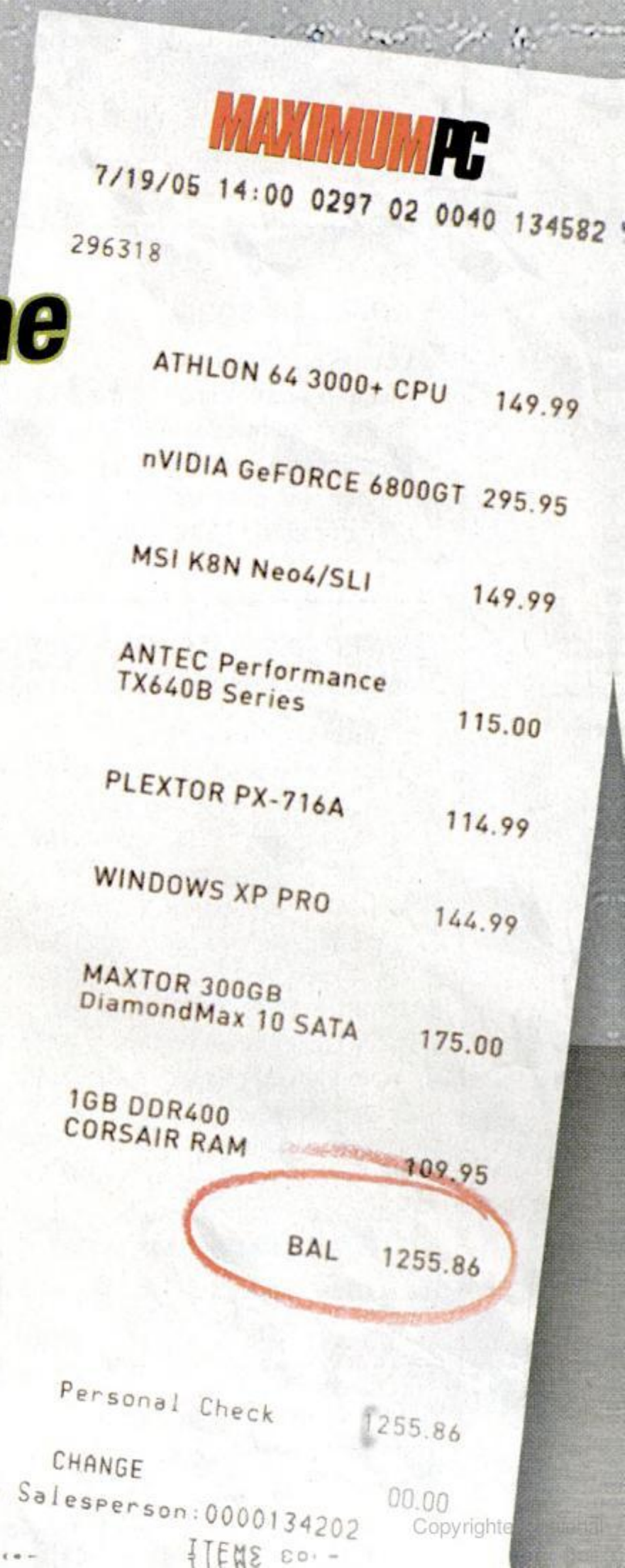
MACHINE 2005

How we built a killer rig for one-tenth the price of Dream Machine



Donald Trump might be able to afford the $12,870 quad-core Dream Machine we built in our September issue, but what about you? You've got a car payment, rent, and a hefty vet bill for your cat Cletus, and unless you want to spend the rest of your life on a steady diet of Top Ramen, your PC hardware budget has to have limits.

So what kind of PC can the average Joe build on a budget stretched thinner than Paris Hilton's G-string? Look no further. While we spared no expense to build the ultimate Dream Machine, we've designed our Lean Machine to be a sleek-and-powerful yet affordable PC that squeezes every drop of performance from each carefully chosen part. Lean Machine 2005 gives you plenty of muscle for games and applications, and enough upgrade headroom so you can add today's top-shelf hardware when it's half-price tomorrow.

BY GORDON MAH UNG

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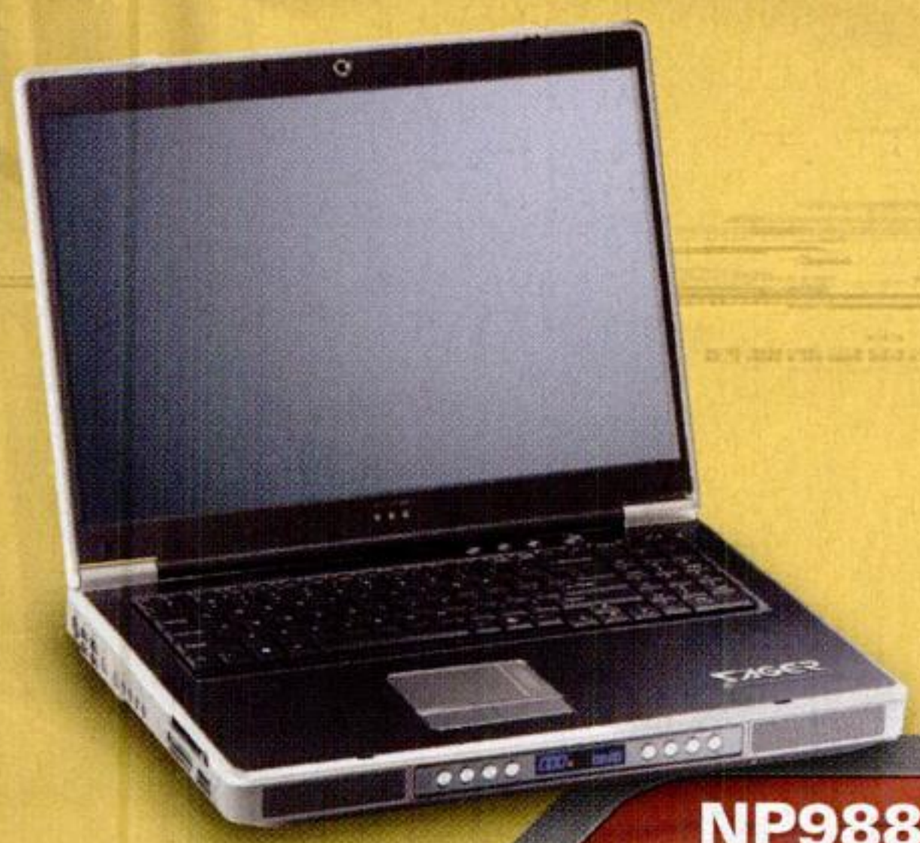
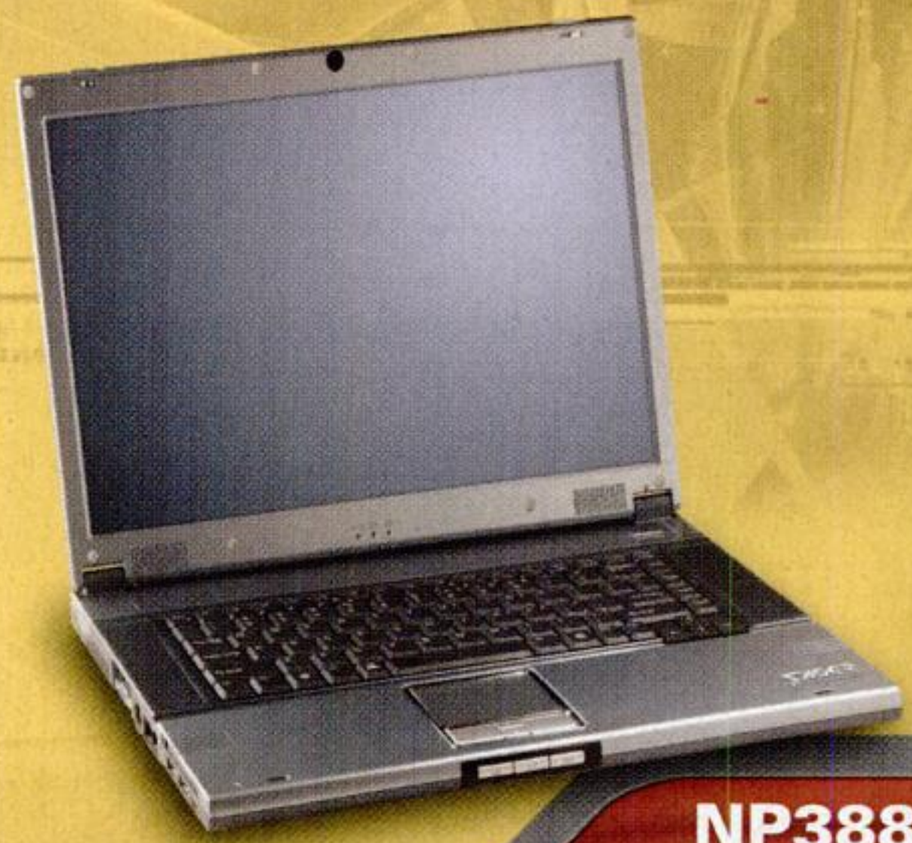


NP9880



NP3880

NP9880C $2395

FEATURES

- Dual Channel DDR2 System Memory supports 400/533MHz, provides the best match for Intel® Processors and enables power efficiencies for data intensive business, multimedia, and gaming applications.
- nVIDIA® GeForce™ Go 6800 Ultra PCI-Express™ Graphics Module[5] with 256MB DDR3 Memory delivers true-to-life graphics at blazing speeds.
- The front panel Audio DJ CD player control with separate power switch lets you play your favorite music CD or MP3 while on the go.
- Dual Optical Device bays and Dual Hard Disk Capability allow this system to be customized with 2 CD-ROM devices and 2 Hard Drives coexisting for maximum storage capacity.

OPTIONS

- 802.11g Wireless Module
- 802.11g and Bluetooth Combo Module
- TV Tuner with Remote

- 17.0" Wide Viewing Angles WSXGA+ Active Matrix Display with Super Clear Glare Type Screen
- Intel® Pentium®4 Processor 530 with HT Technology (1MB L2 Cache, 3.0GHz, 800MHz FSB)
- 256MB DDR3 nVIDIA® GeForce™ Go 6800 Ultra PCI-Express™ Graphics
- 512MB Dual Channel DDR2 SDRAM at 533MHz
- 40.0GB 5400RPM Ultra ATA100 Hard Drive
- 8X DVD[2]/24X10X24 CD-RW[3] Combo Drive
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- Built-In Digital Video Camera
- Built-In 7-in-1 Card Reader
- 4 Built-In Speakers with a Subwoofer
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- Microsoft® Windows® XP Home Edition
- Sager's Umbrella Protection Policy

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- nVIDIA® GeForce™ Go 6600 PCI-Express™ Graphics with 128MB DDR Memory delivers best-in-class performance and brilliant video for gaming and multimedia business applications.
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  – Intel® Pentium® M Processor 740 (2MB L2 Cache, 1.73GHz, 533MHz FSB)
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- 512MB Dual Channel DDR2 SDRAM at 533MHz
- 40.0GB 5400RPM Ultra ATA100 Hard Drive
- 8X DVD[2]/24X10X24 CD-RW[3] Combo Drive
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LEAN MACHINE 2005

Continued from page 46

LEAN MACHINE BARES ALL

BUILT-IN HI-FI The Sound Blaster Live chip on the K8N Neo4/SLI gives us hardware-accelerated audio without the need for additional hardware.

BRIDGING THE GAP We taped the SLI bridge inside the case for that rainy day when 6800 GT cards are $100 and we need more power.

PLANNING FOR TOMORROW Though more expensive, we chose the Athlon 64 in Socket 939 over Socket 754, for its better upgrade options.

THE BENCHMARKS

WALKING THE TIGHTROPE BETWEEN PRICE AND PERFORMANCE

Naturally, anyone who's building or upgrading should ask themselves what they want to do with their PC and how much moolah they want to spend. We wanted a budget box capable of playing today's games at reasonable resolutions and managing multiple open applications without choking. We also wanted a machine that would still feel competent in 12 or 24 months, with room to grow from there.

Our first thought was to use AMD's newly announced Sempron 3400+. With its 64-bit capability and 2GHz clock for a mere $140, it's a hell of a deal. Unfortunately, the Sempron is limited to a Socket 754 mobo. We haven't seen SLI in any S754 boards, and dual-core is limited to the Socket 939 interface. In the end, we went with the 90nm version of the Athlon 64 3000+.

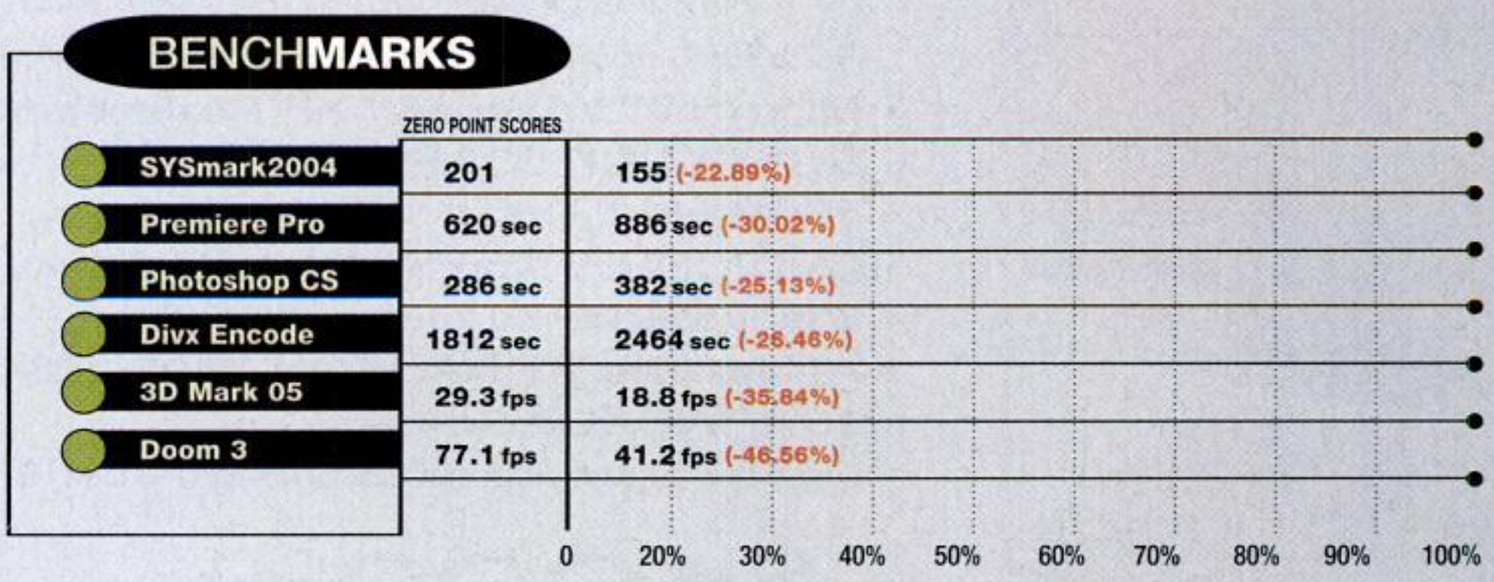
Is the 2GHz Sempron faster than the 1.8GHz Athlon 64? In some apps, probably. In other apps, the Athlon 64's dual-channel RAM and larger cache (512KB in the A64 vs. 256KB in the Sempron) give it the edge. More importantly, the Socket 939 platform gives us plenty of upgrade options. The Athlon 64 FX-57 and the Athlon 64 X2 4800+ both set you back $1,000 today, for example, but in a year, we can guarantee that the prices for each will be considerably lower. You'll be able to sell your 3000+ to a needy chump and put an FX or X2 into the MSI K8N board.

Using the K8N Neo4/SLI had a huge impact on our videocard choice. Initially we were going to use ATI's Radeon X800 XL card, which is slightly cheaper and a tick faster than its nVidia counterpart. It was a done deal until we realized we wanted a dual-card option down the road. Because ATI's CrossFire is still nothing but promises, we booted the X800 XL for an nVidia GeForce 6800 GT.

Not that the 6800 GT is a bad card; in fact, it's pretty close to the X800 XL. And with two 6800 GTs paired in SLI, there's no comparison.

So where does the Lean Machine stand in performance? Not bad, all things considered. We knew our single 6800 GT couldn't stand up against two 6800 Ultras, but it still fared well—just don't expect to run *Doom 3* at 1920x1200 on your flat panel with 4x AA turned on. We also give up 30 percent in clock speed and half the L2 cache with our 1.8GHz Athlon 64 3000+ versus the 2.66GHz FX-55 in our zero-point machine. As a result, we lose between 20 and 30 percent in performance in the CPU-bound tests. Considering that the Athlon 64 FX-55 costs about $800 while the 3000+ cost $160… well, that says it all.

And this is what it's really about: price. Just the two 6800 Ultras in our zero-point machine cost as much as the entire Lean Machine. For that matter, just a single CPU from this year's Dream Machine costs as much as the entire Lean Machine. One CPU! Such is life. MPC



Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

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Master Your Videocard's Control Panel

Tap into your videocard's hidden power with this detailed look at ATI's and nVidia's videocard control software

TIME 00:17 HOURS:MINUTES

Come on, admit it: The last time you paid any attention to your videocard's display utility was when you first installed the card (or updated to the latest driver) and changed the card's default resolution and refresh rate. If that's the case, you've barely scratched the surface of your hardware's capabilities. There's a reason why ATI and nVidia employ so many software engineers: They're not only coming up with low-level tricks to make the hardware run faster, they're also developing tools that make your PC more attractive and easier to use. Whether you're a GeForce enthusiast or a Radeon disciple we'll show you how to tap into some of the most useful tools you might have never known existed.

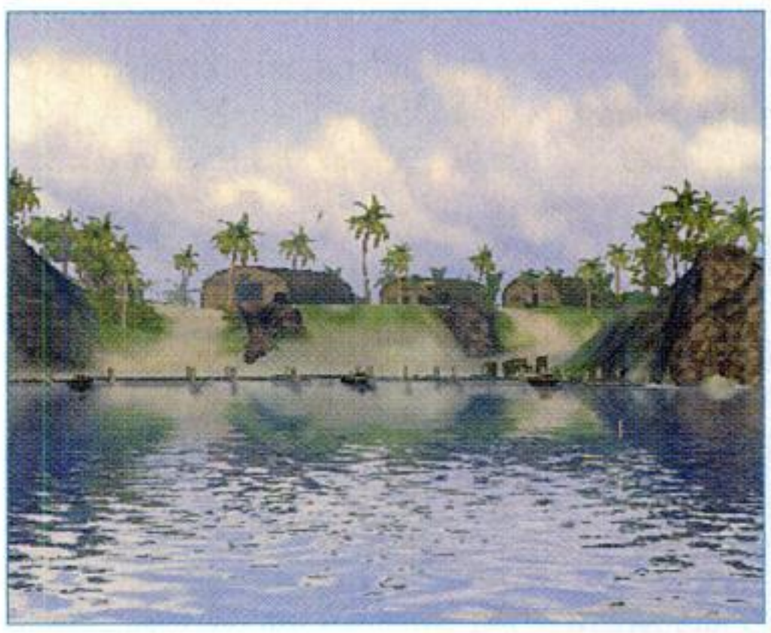
BY MICHAEL **BROWN**

1 ANTIALIASING AND ANISOTROPIC FILTERING

Whether you're using an ATI or an nVidia videocard, one of the easiest ways to improve the look of the games you play is to tweak the amount of antialiasing and anisotropic filtering work the card performs. As with many of the adjustments we'll show you here, this will entail a tradeoff between performance and visual quality:

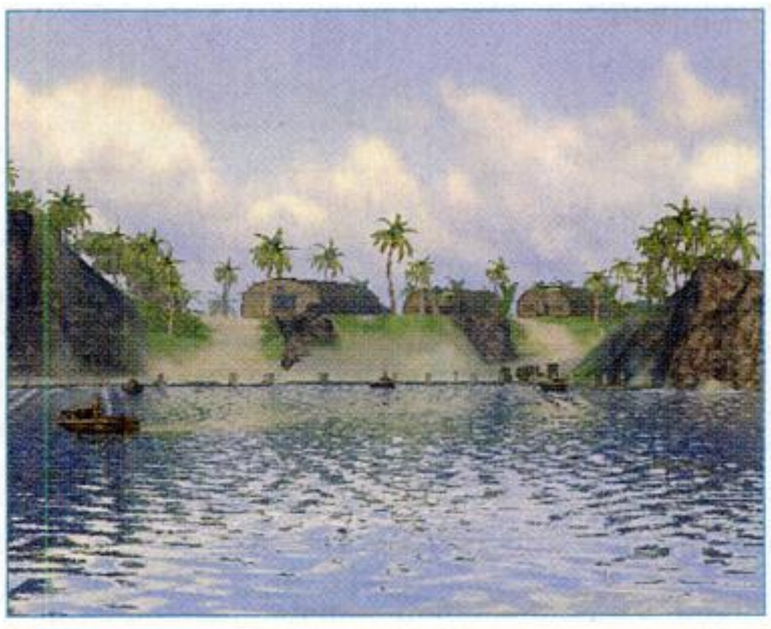
Increasing the level of antialiasing and anisotropic filtering will decrease frame rates. Of course, the faster your videocard, the less of a tradeoff you'll experience. Check out these screenshots to see what we're talking about.

In this close-up shot, the videocard isn't applying any antialiasing to the scene. As a result, the lines depicting the gun's handle have very jagged edges.



Anisotropic filtering corrects a texture's perspective when the object on which its applied stretches deep into a scene. In this shot, we've set the card to use only 1x aniso. Notice how the water blurs as it extends to the other beach.

This time, we've instructed the videocard to apply 8x antialiasing to the scene. Notice how much smoother and more realistic the edges of the gun's handle appear.



With the card set to use 8x anisotropic filtering, the water texture maintains its integrity all the way to the beach across the bay.

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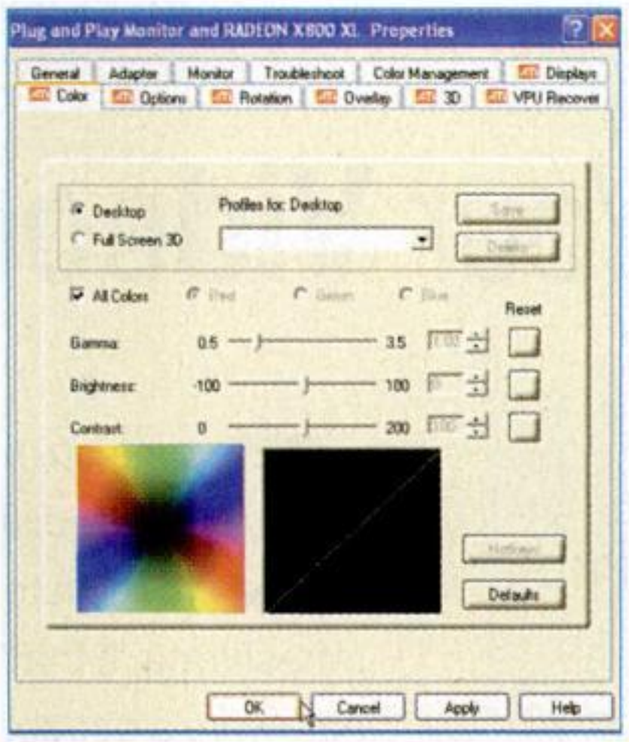
2 ATI CATALYST

GETTING STARTED

ATI offers two types of control-panel software: the newb-friendly *Catalyst Control Center* (which requires Microsoft's .NET framework) and the more conventional Catalyst driver. In a nod toward user friendliness, the *Control Center* defaults to hiding its tools within an elaborate user interface. We prefer the more transparent Catalyst driver, so that's what we'll use here. Download both and see which one you prefer, but you absolutely must uninstall one before installing the other.

Right-click your Windows desktop, and then click Properties from the pop-up menu, then the Settings tab in the Display Properties window, and then the Advanced button. Next, click the Options tab and compare the Catalyst version displayed here to the latest version available on ATI's website, to ensure you're running the latest version.



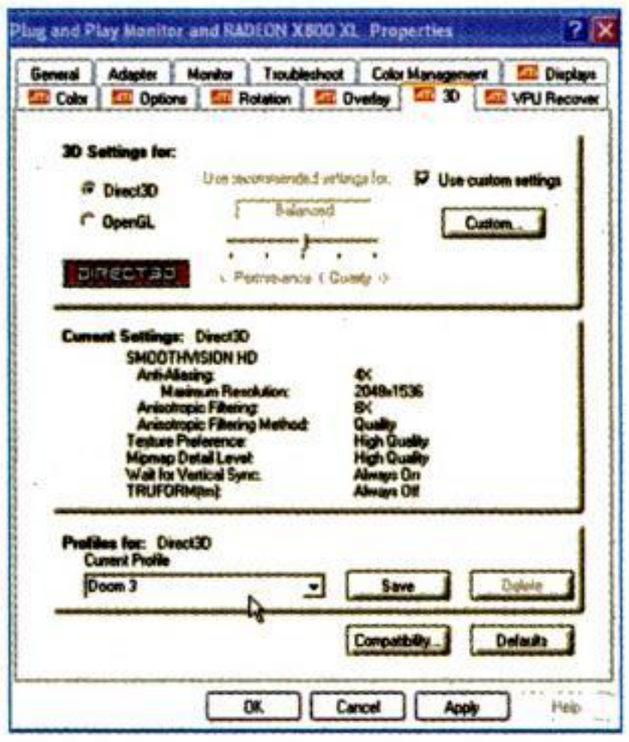
We favor the straightforward Properties window over ATI's newb-friendly *Catalyst Control Center*, which hides nearly all of the driver's most important functions by default.

CREATING APPLICATION PROFILES

Click the 3D tab and you can define custom profiles for each game you play. The first step is to click the radio button to choose between creating a profile for either a Direct3D or an OpenGL app. Using the slider on this tab, you can adjust global settings (displayed in the box beneath the slider) to obtain all-out performance at the expense of image quality, optimal visual quality at the expense of performance, or a happy balance. Advanced users, however, will tweak individual settings by placing a checkmark next to "Use custom settings" and then clicking the Custom button to open the Direct3D (or OpenGL) Properties window.

By default, Catalyst allows applications to control settings such as antialiasing and anisotropic filtering, but you can easily override these choices within this window—simply remove the checkmarks next to Application Preference. Boosting these settings will improve image quality, but reduce performance. Click the Default button to return the settings to factory spec.

Once you've customized your Catalyst settings, save the profile by typing a unique name in the Custom Profile box, and clicking the Save button. You can create a different profile for each game or application, if you'd like; but because the driver defaults to the profile that was active when you shut down your PC, you'll need to change the profile each time you switch programs.

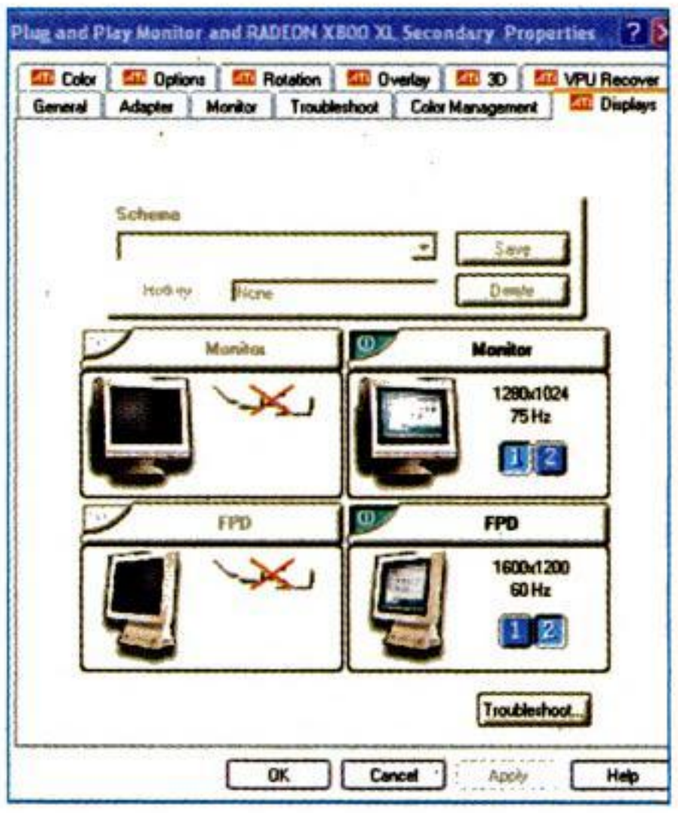


ATI's driver provides tools to create custom profiles for games and other 3D applications.

DISPLAY CONFIGURATIONS

The Catalyst Display tab shows each monitor that Windows has detected. To designate a monitor as your primary display, click the "1" button in its box. Click the Monitor title bar and Catalyst will open a second Properties window with additional options. The DDC Information box in this window shows the maximum resolution and refresh rate that the monitor supports. The monitor sends this information to the videocard over the Display Data Channel.

You can set up a variety of display configurations for different situations and save them using the Schemes tool. Assign a hot key to each scheme and you can switch to it in a moment's notice.



This panel is of particular interest to anyone with more than one display connected to a Radeon videocard.

OTHER CONTROLS

WMV Acceleration will accelerate the playback of Windows Media Video (WMV) files in *Windows Media Player 10* (you must be using Catalyst version 5.6 or higher). In addition to placing a checkmark next to this item, however, you'll also need to install the Windows DRM (digital rights management) update *and* the Windows Media Player Hotfix, which you can download from Microsoft's website. Searching for these updates on Microsoft's website will drive you nuts, so just point your browser to ATI.com and search on the phrase "Windows Media Player Hotfix." You'll find both detailed instructions on how to implement this feature and links to the downloadable files on Microsoft's site.

If you're having problems with display corruption (or no display at all) at high resolutions on your LCD monitor, a checkmark next to "Reduce DVI frequency on high-resolution" will resolve the problem. If you're using a DVI-to-VGA adapter, however, this setting will have no effect. A checkmark next to "Alternate DVI operational mode" will also help with display-corruption problems on an LCD monitor.

Continued on page 54→

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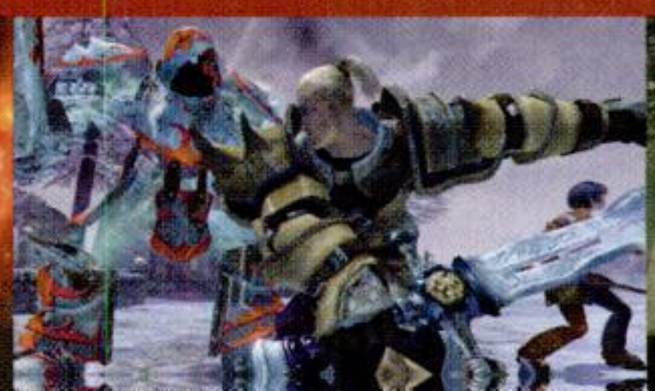

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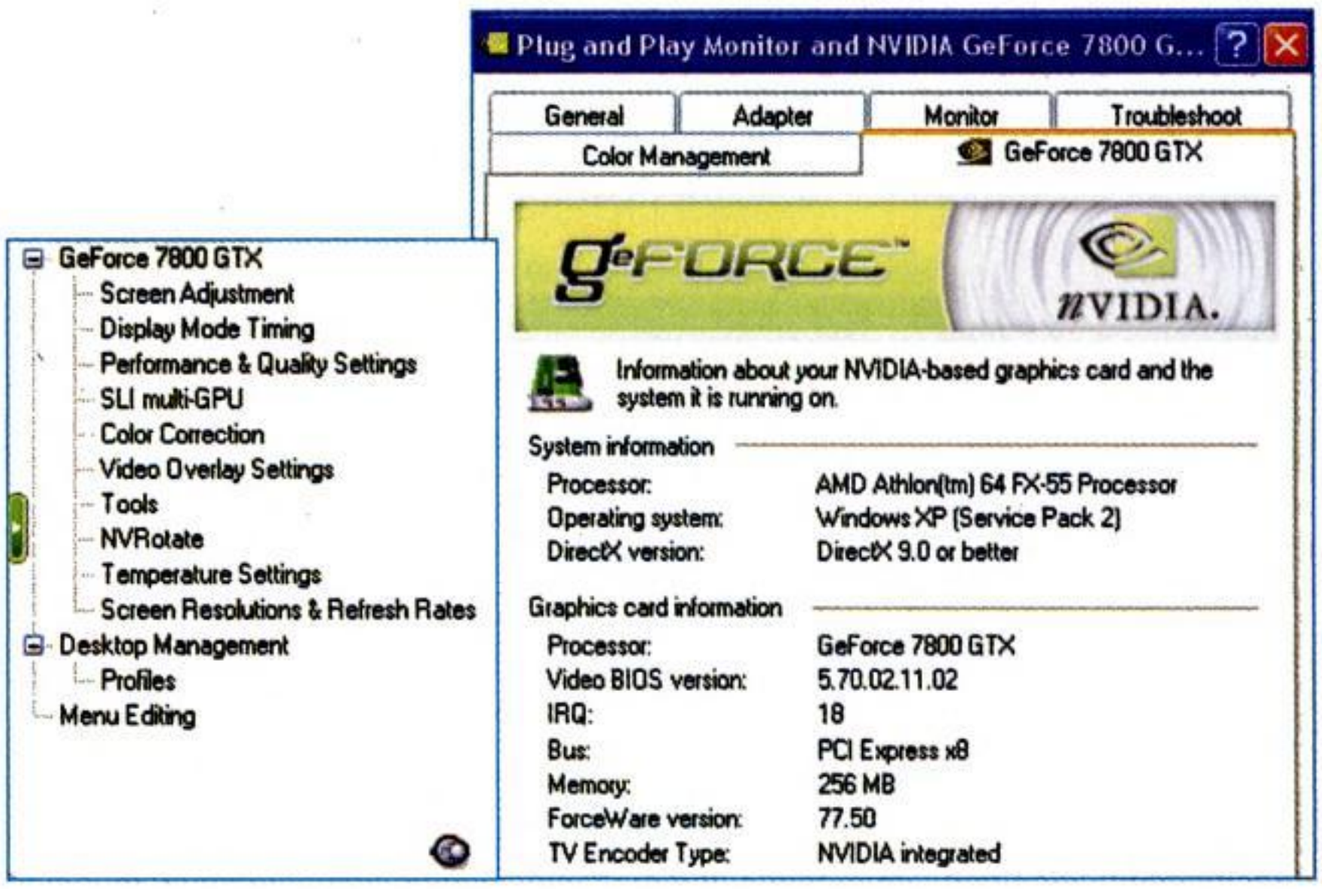
Continued from page 52

3 NVIDIA FORCEWARE

GETTING STARTED

To access your nVidia card's most powerful tools, right-click your Windows desktop, and then click Properties from the pop-up menu, then the Settings tab in the Display Properties window, and then the Advanced button. Next, click the GeForce tab. The GeForce tab tells you everything you need to know about your videocard, and if you have a motherboard with an nVidia nForce chipset, it'll tell you about the rest of your system, too. If you want to know if you have the latest videocard driver installed, compare what you see here to nVidia's website. The menu attached to the left side of the nVidia tab within the Advanced Settings window is where the action is (see screen to the right).

Some of the tips we'll discuss below depend on nVidia's *nView Desktop Manager* features being activated, so let's do that now. Click Desktop Management in the left-hand pop-out menu, and then move your mouse back to the main GeForce menu, which should now display the subtitle nView. In the nView Desktop Manager box, click the Enable button. This will open a new set of Desktop Management options in the pop-out menu. We'll use some of these later.



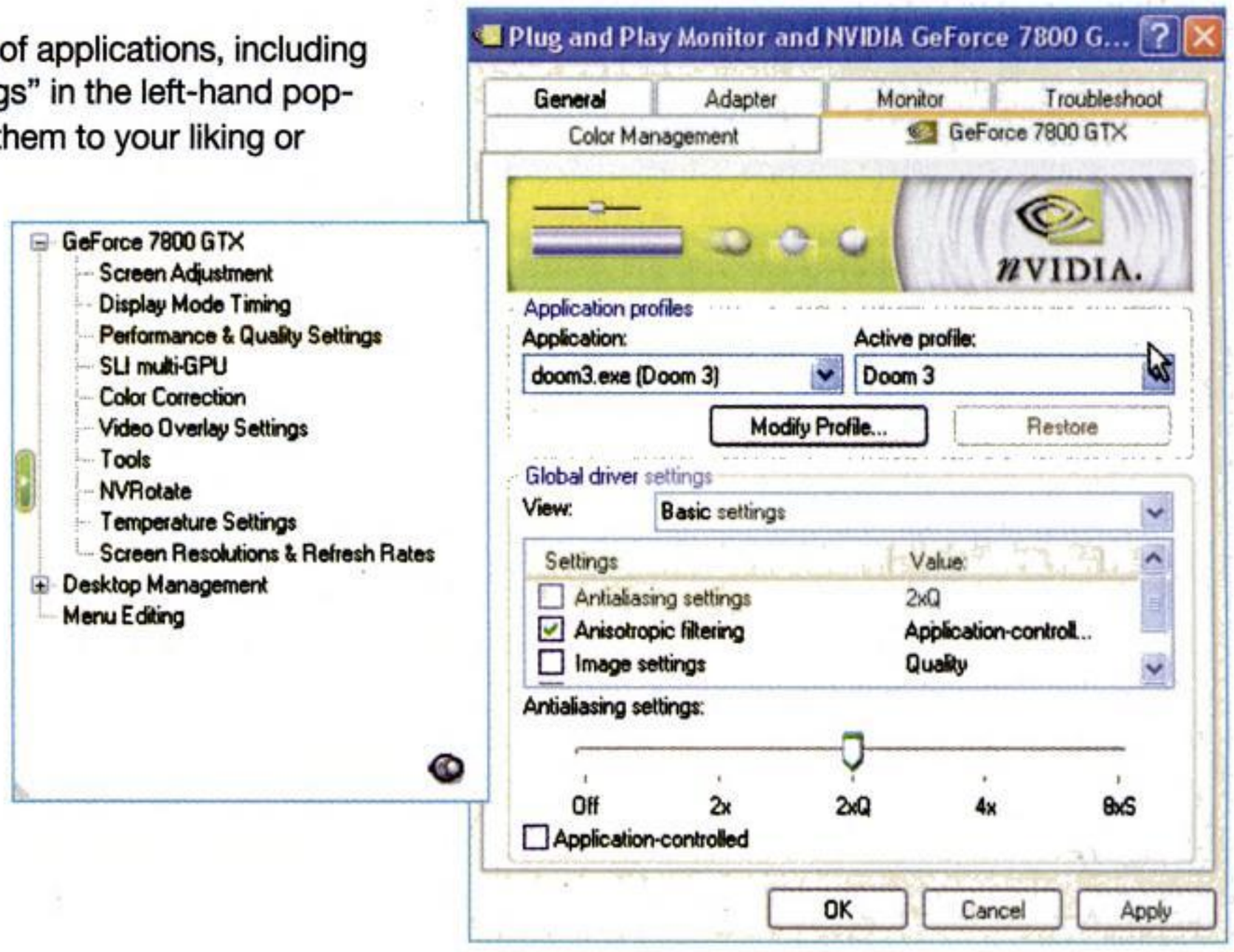
You can tweak nearly every aspect of your nVidia videocard from within this properties window.

TWEAKING APPLICATION PROFILES

nVidia has created custom display profiles for a broad range of applications, including many popular games. Click "Performance and Quality Settings" in the left-hand pop-out menu to access these profiles and you can easily tweak them to your liking or even create new ones from scratch. For games you regularly play in both single- and multiplayer mode, consider defining a single-player profile that trades a little performance for enhanced visual quality, and a multiplayer profile that compromises some visual effects in the name of faster frame rates.

Profile settings reflect the options that are available within a given application. Choose the *Doom 3* application profile, for example, and you'll see settings for antialiasing, anisotropic filtering, image quality, and vertical sync. AA and aniso have an additional checkbox, labeled "Application Controlled." If this box is checked, the driver will use the settings defined within the application; uncheck it, and you can change the setting within the profile. If the box is ghosted, AA and aniso options are not available for this app.

When you're finished, click the Modify Profile button and save the profile under the same name, so that it's automatically activated when you launch the application. You can easily restore nVidia's original profile by selecting it from the list and clicking the Restore button.



Use nVidia's application profiles to set specific display parameters for your favorite games and other programs.

You can follow similar steps to create a profile for a new game from scratch. Set the application listed under the Active Profile heading to "global driver settings," click the Add Profile button, and give the new profile a name. You can associate this profile with any application listed in the window. If the application you want to work with isn't listed, you can add its executable to the list by clicking the Browse button and searching for it.

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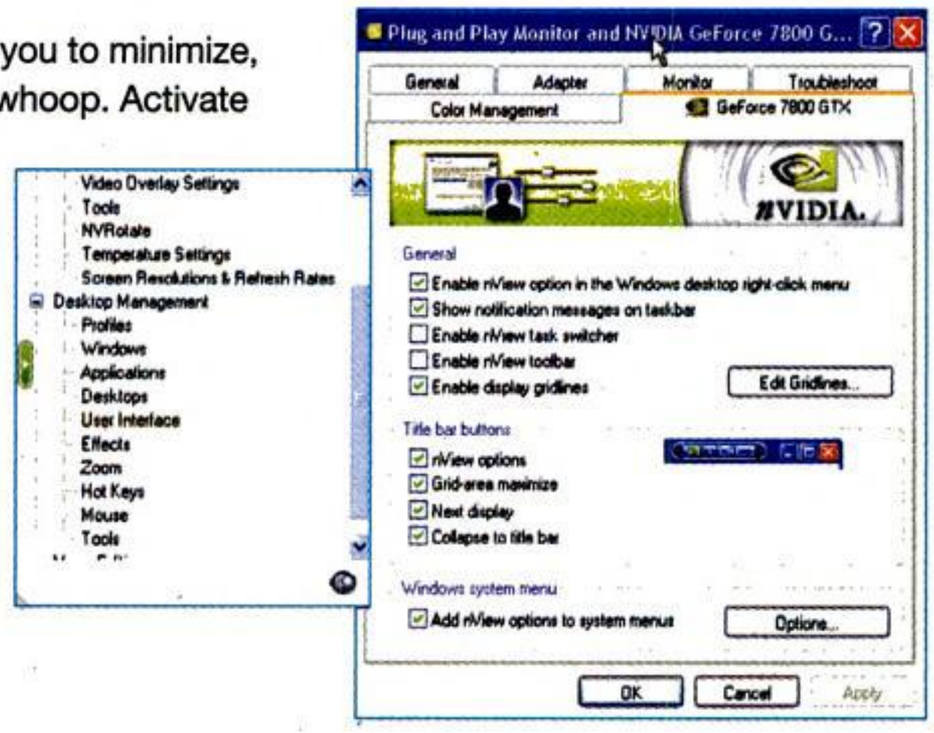
NVIDIA FORCEWARE (continued)

TITLE BAR BUTTONS

Windows' title-bar buttons enable you to minimize, maximize, or close a window. Big whoop. Activate nVidia's title-bar buttons and you can instantly resize a window to fit a screen section, send the window to a different monitor, roll the window up into the title bar, and a whole lot more.

Get back to the User Interface menu, if you're not already there. Place checkmarks next to all the items listed in the box labeled "Title bar buttons," and then click the Apply button. Open any resizable window and you'll see a new set of buttons in the title bar. Click the button with nVidia's logo and a menu will appear displaying all your nView options. The other buttons, from left to right, perform more specific functions: Click the Collapse to Title Bar button, and the entire window will roll up into the title bar. Click it a second time to restore the window to its previous size. Click the Next Display button to send the entire window from your first display to your second. The final button maximizes the window within its assigned grid section; click it a second time, and the window will maximize to fill the Windows desktop. The standard Windows title-bar buttons, meanwhile, retain their original functions.



The *nView* title-bar buttons make managing a plethora of windows a breeze, especially if you have more than one monitor.

DISPLAY GRIDLINES

As displays grow larger and multiply, screen real estate becomes more and more difficult to manage. nVidia's solution is to create an invisible grid, so that you can quickly assign windows to individual sections of the same display. GeForce cards allow you to divide your monitor into two, three, or four sections.

Scroll down to Desktop Management in the left-hand pop-out menu and choose the User Interface option. Check Enable Display Gridlines and then click the Edit Gridlines button. A menu will appear over your desktop. Click anywhere on the screen, hold the left mouse button down, and drag to draw a vertical or horizontal line. This will divide your screen into two sections on either its vertical or horizontal axis. Draw second or third horizontal or vertical lines and you can divide the screen into as many as four sections. You can click and drag the lines to resize the sections, and you can remove them by selecting one (it will turn red) and hitting the Delete key. Click and hold down on Show Grid Names in the overlay menu and the videocard will overlay a number within each grid.

When you exit the Grid Settings menu and drag any of your resizable windows, the gridlines will temporarily appear. Drag a window until a majority of it is within a particular section, and the window will automatically resize to fit that section without wasting a single pixel of display area. MPC

Use the Display Gridlines option to divide your display into as many as four sections of varying sizes.

Ask the Doctor

Diagnosing and curing your PC problems

MISSING: 1GHZ

I recently reinstalled my OS. After I had my PC back up and running, I noticed that Windows XP's System Properties reports that my computer is running at the specified 2GHz, but MSI's Core Center utility tells me it's running at only 1GHz. All settings in the BIOS are set to the proper front-side bus and multiplier defaults. What gives?

—Jake Moxon

If you're running an AMD CPU, you probably have AMD's "Cool'n'Quiet" feature turned on. Cool'n'Quiet helps keep the system cooler and quieter by lowering the clock speeds and voltage consumption whenever the processor is not under a heavy load. Then again, XP's System Properties *should* reflect the CPU's clock speed in its cool mode. Whether or not you decide to leave Cool'n'Quiet activated, you might also try overriding your default BIOS settings by manually setting them to the correct multiplier and FSB for your particular part.

MAC ATTACK

I'm moving into an apartment next year with three other guys, one of whom is a Mac user. We plan to sign up with a cable ISP, and I'll probably be in charge of supplying the wireless router. Will I run into any problems hooking a PC and a Mac into the same network?

—David Hoang

Pretty much any router you buy today will work with both Macs and PCs. Just set the router to assign IP addresses to the computers on your network via DHCP, turn on the Mac, and it should be good to go.

Continued on next page→

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Ask the Doctor

Continued from page 55

Ginny is a very bad kitty.

FELINE FETISH

I have a problem. Ginny, one of my four cats, is constantly licking my CDs. She seems to prefer CD-Rs and DVD-Rs to pressed media. This was cute at first, but it's becoming a problem as some of my CDs are getting stained with cat saliva. Is cat saliva bad for the discs? More importantly, is licking the discs bad for the cat? And what is it about the discs that would make a cat want to lick them?

—Matt Putzel

The best way to curb this behavior is to catch Ginny in the act of licking your CDs and tell her firmly "Bad cat!" Next, take all your blank media and put them in jewel cases. Problem solved. As for whether or not the CDs are harmful to Ginny's health, our contact at Verbatim tells us there's nothing in the outer layer of the disc that would harm a cat. As for *why* she licks the CDs, it's probably because she either likes the taste or the way it feels on her tongue. In fact, one of the Doctor's cats loves to lick the window blinds—probably for the same reason.

There's not much you can do to dissuade Ginny from licking your CDs, aside from spraying her with a water bottle when you catch her in the act; but that would also get your precious media wet.

PENTIUM III VS. SEMPRON: FIGHT!

*My daughter's PC is a hand-me-down box that I built from spare parts. It has an 866MHz Pentium III, 512MB of RAM, and a GeForce FX 5700 card. She can't play **Unreal Tournament 2004** or **Half-Life 2** at 1024x768 without turning the graphics way, way down. Because the FX 5700 was fine at those games in my PC (a 2.4GHz P4), I'm convinced she needs a new CPU. Would upgrading her system to a Sempron enable her to play modern games at 1024x768 with her current videocard?*

—Christian Smyth

If you're really happy with the frame rates you can get from an FX 5700 and a 2.4GHz P4, a Sempron should be very impressive. Just make sure you upgrade her to a Socket 754 Sempron, and not a Socket A Sempron. The Socket 754 Sempron is a K8-based CPU and should provide quite an uptick in performance over a Pentium III.

AMD will introduce a new and very affordable 64-bit Sempron series just in time for your upgrade. In bulk, the 64-bit AMD Sempron processors 2600+, 2800+, 3000+, 3100+, and 3300+ will be priced at U.S. $74, $83, $98, $113, and $140, respectively. Remember, you'll also need to upgrade your motherboard and memory. In fact, you just might want to hand down your old P4 and build yourself a new Sempron system, instead. If you decide to buy a new 64-bit capable Sempron, make sure your vendor knows the difference between it and the old 32-bit version.

ROTTEN ROUTER

I have a 512Kb/s DSL connection and a Linksys Etherfast Cable/DSL router. Each time I reboot my PC, I find that I have to reset the router in order to access the Internet. I've already double-checked all my cable connections, but I'm constantly losing my Internet connection. What do you think is going on?

—Eric Clyne

Any time you have a router problem, the first thing you should do is update the router's firmware. You'll find the latest firmware for your router at www.linksys.com/support. If that doesn't solve your problem, try bypassing the router and connecting your computer directly to your DSL or cable modem. If you continue to have problems when your router is out of the loop, the router isn't the source of your problem—you just have a flakey connection. If your Internet access is via DSL, make sure that filters are installed on every device that's plugged into your phone jacks; otherwise, inbound and outbound calls can interrupt your DSL connection. If none of these troubleshooting tips solves your problem, you'll need to get your ISP's customer-service department involved.

ROUND PEGS, SQUARE HOLES

I purchased an ATI 9800 Pro videocard, and then discovered that I can't install it in my Dell Dimension 4600C thin-client PC. So I've decided to buy a mid-tower case and put the Dell motherboard in it. Now my only problem is that I can't find a case that will accommodate the motherboard. Help!

—James Zeng

One of the Doc's biggest complaints about Dell is that the company insists on using proprietary motherboards and power supplies, which makes them very difficult to transplant into new cases. In fact, you typically can't even upgrade the PSU. The 4600C is designed to consume as little space as possible; as a consequence, its interior is so cramped that it will only accommodate half-height expansion cards—and there's no such configuration for the 9800 Pro.

Your best bet is to donate that old PC to your mom—or to some other non-gaming relative or friend—and start from scratch. MPC

Is your Dream Machine turning into a nightmare? Are you waking up in a cold sweat because your PC can't cope with today's hardware? Look to the west, my sons and daughters, for the Doctor is here to save you. E-mail all your PC problems to **doctor@maximumpc.com.**

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White Paper: Digital Audio Projectors

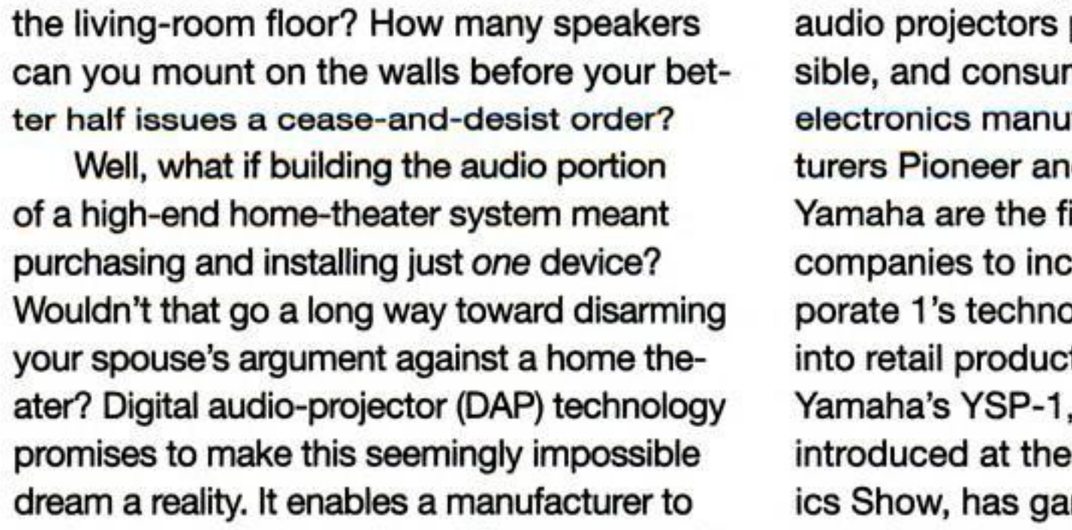
Using acoustic tricks that would be familiar to a skilled ventriloquist, a digital audio projector can beam audio around a room to duplicate the impact of a 5.1-channel surround-sound system

BY JOEL **DURHAM JR.**

Success or failure in building the ultimate home theater often hinges on the spouse factor. How much will your significant other allow you to spend? How many wires will he or she tolerate snaking across the living-room floor? How many speakers can you mount on the walls before your better half issues a cease-and-desist order?

Well, what if building the audio portion of a high-end home-theater system meant purchasing and installing just *one* device? Wouldn't that go a long way toward disarming your spouse's argument against a home theater? Digital audio-projector (DAP) technology promises to make this seemingly impossible dream a reality. It enables a manufacturer to enclose a multi-channel amplifier, a surround-sound decoder, a speaker array, and configuration software in a single cabinet.

By projecting sound waves to specific locations in a room, much like a stage ventriloquist "throws" his voice, a digital audio projector can fool your ear into believing that sound events are emanating from various locations inside a room—to the left, right, center, or rear of your head—even though they're actually originating from a single source.



Yamaha's YSP-1 digital audio projector ($1,500) uses DSP technology and 42 individual speakers (visible here with the grill removed) and amplifiers to replace a 5.1-channel A/V receiver and surround-sound speaker setup.

HOW DIGITAL AUDIO PROJECTORS OPERATE

British manufacturer 1 Ltd. has done much of the pioneering research and development to make digital audio projectors possible, and consumer electronics manufacturers Pioneer and Yamaha are the first companies to incorporate 1's technology into retail products. Yamaha's YSP-1, introduced at the 2005 Consumer Electronics Show, has garnered the lion's share of attention, thanks to the fact that it retails for $1,500; Pioneer's PDSP-1 digital sound projector, introduced back in 2003, is saddled with an astonishing $40,000 price tag.

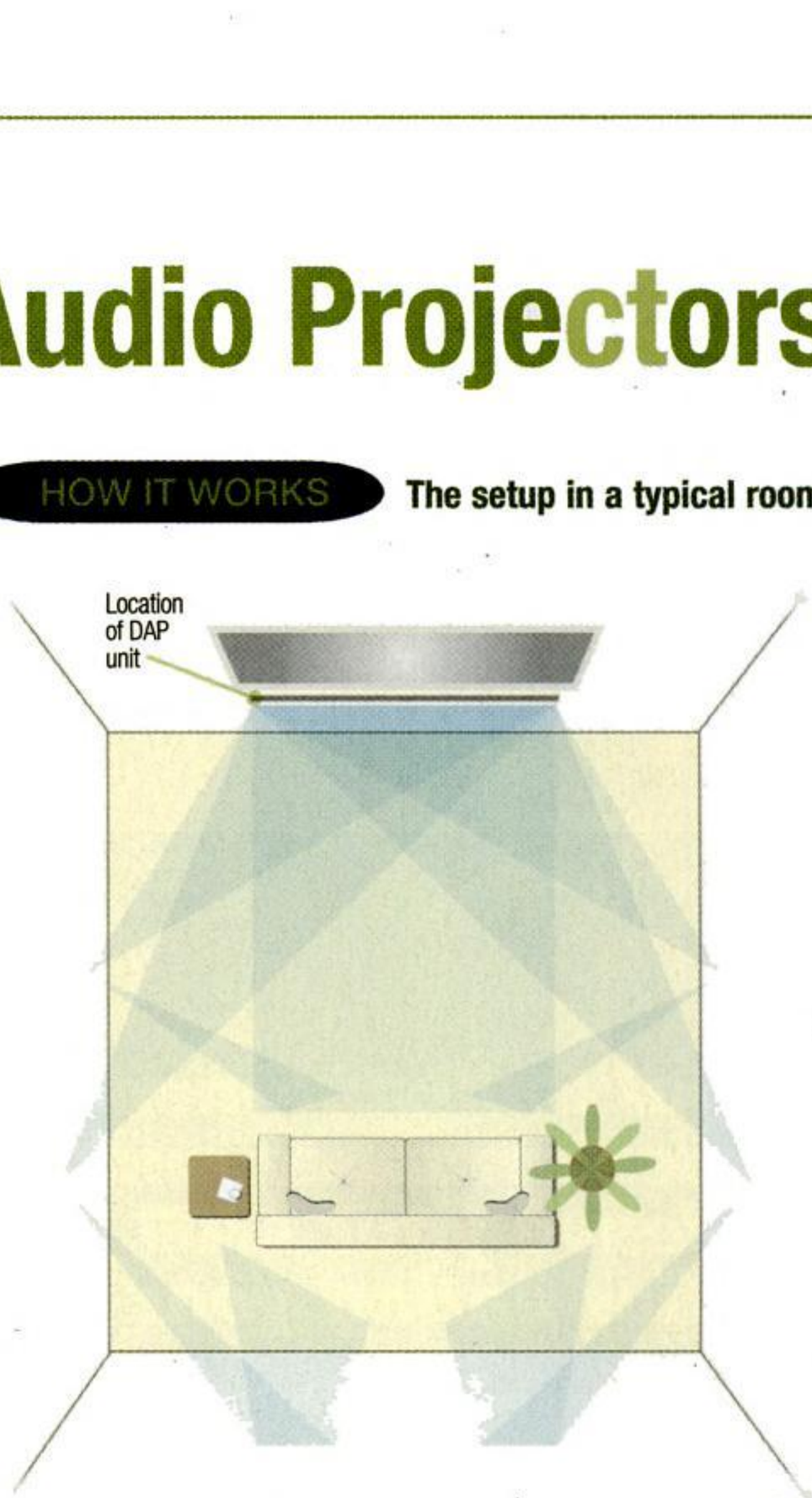
1 Ltd.'s Digital Sound Projector chipset consists of two components: A digital signal processor (DSP) that the company has dubbed the Beam Forming Processor Chip, and a digital Class D amplifier. The beam-processor chip decodes surround-sound algorithms, such as Dolby Digital and DTS. It's capable of processing up to eight channels of audio and converting them into "beam-forming" instructions for as many as 256 transducer-type speakers. The amplifier takes these instructions and plays them through the appropriate speakers to create the illusion of surround sound.

It's vital that the digital audio projector be calibrated for the shape and size of your listening environment. Once that's done and an audio source, such as a DVD player, is connected to the system, the DAP is ready to create its audio illusions.

In a surround-sound configuration, the DSP chip forms unique audio beams by splitting and routing the audio signals to select groups of speakers within the projector. By taking the shape of the room into account, the DSP inserts a delay for each speaker and makes micro adjustments to the output of each amp to create five distinct audio beams: left front, right front, center, left surround, and right surround. By directing these beams along tightly focused paths and using the walls

HOW IT WORKS

The setup in a typical room



►A digital audio projector (DAP) uses an array of small speakers and amplifiers, coupled with a powerful digital signal processor, to "beam" audio signals around a room (as illustrated by the blue shaded areas above). By bouncing the audio off a room's walls and ceiling, the DAP fools the listeners' ears into believing that sounds are emanating from specific locations.

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and ceiling to reflect and disperse the sound waves, audio events arrive at your ear at precisely the right moment and trick your brain into perceiving the sounds in parts of your room with no speakers.

Both the Yamaha and the Pioneer digital audio projectors are thin enough to mount on the wall, either beneath a flat-screen television or behind a video-projector screen. Both systems also feature built-in software that allows you to configure their speaker arrays for a variety of room and furniture configurations (using an onscreen display), virtually eliminating the need to arrange your furniture around your A/V system.

DAP technology is not without its critics, who point out that the solution relies heavily on several unknowable variables, including room dimensions; where the digital audio projector will be placed within the room; and the configuration of walls, ceilings, furniture, and other sound-reflecting objects in the room. In a room with a cathedral ceiling, for instance, it might be difficult to correctly time the bounce of sound waves off that surface. The same goes for oblong rooms with walls that are not equidistant or that have a large opening on one side, but not the other.

THE FUTURE OF DIGITAL AUDIO PROJECTORS

Believe it or not, many of the surround-channel speakers in the home-theater systems purchased today end up being put back in the box, never again to see the light of day. For many folks, the required wiring and calibration end up being just too much of a hassle. Pundits predict that digital audio projectors are the answer, and they're forecasting a bright future for the technology. After all, why run wires to inconvenient surround-sound speakers when you can install one audio projector under your TV?

Besides being housed in stand-alone units like the Pioneer and Yamaha models discussed here, digital audio projectors could easily be integrated into next-generation flat-panel displays. And if the technology catches on in either implementation, prices should drop rapidly as economies of scale kick in. Analysts expect $500 price tags to be the tipping point for the technology to achieve mainstream acceptance.

Because you don't need a separate amplifier, don't need to drill holes in your walls, and don't need to snake speaker cable all over the living room, digital audio projectors should render the spouse factor a non-issue for many home-theater enthusiasts. MPC

Anatomy of a Power Supply

Curiosity has killed uninitiated cats who tinkered with their PC's power supply. These devices retain lethal voltages, even when unplugged, so we don't advise opening them. Besides, we've safely done it for you!

FAN The fan draws the hot air radiating from a heatsink out of the power-supply enclosure. High-end power supplies typically have either dual fans or one large fan (typically 12cm) to ensure your power supply gets maximum airflow to maintain low temps.

HEATSINKS Transistor switches provide high-frequency power to transformers, and diodes resolve AC power to DC power. Both processes generate heat, which—if not managed—will reduce the power supply's efficiency. Heatsinks increase the surface area over which heat can be distributed and radiated, which helps keep the power supply cool.

EMI FILTER EMI (electromagnetic interference) is electrical noise—spikes in the power spectrum—generated by the switching action of the power supply. An EMI filter attenuates the amount of EMI that is reflected back into the power line.

INPUT CAPACITOR Capacitors store electricity to help compensate for fluctuations in power coming from the outlet. The input capacitor kicks in a little extra juice if the incoming power dips below spec. The bigger the capacitor, the better.

OUTPUT CAPACITOR (beneath heatsink) A power supply must be able to react to sudden power draws from PC components, such as when two hard drives spin up at the same time. The output capacitor stores electricity and metes it out so that all devices receive a steady supply of current, regardless of load.

POWER FACTOR CORRECTION (not shown) Power factor is a measure of how efficiently electrical power is being used, and is expressed as a value between 0 and 1. The closer the power supply comes to delivering the ideal power factor of 1 (where 1 volt-ampere produces 1 watt), the more efficient the power supply will be and the less strain it will place on your PC's wiring. Power factor correction (PFC) is a process that boosts an electrical device's power factor closer to 1, using one of two techniques: passive or active. Passive PFC uses a simple capacitor, but this technique typically increases the power factor to between just 0.75 and 0.80. Active PFC employs a more complex circuit and is much more effective—it can increase the power factor to 0.90 or higher.

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MINI PREVIEWS

NEW VIDEO GEAR

Camcorders with hard drives; projectors that light up blackboards

DIRECT-TO-DISK CAMCORDERS

In Hollywood, "direct to disc" denotes a movie unworthy of theatrical release. With JVC's new Everio G series of camcorders, "direct to disk" denotes the ability to record video directly to a built-in hard drive.

JVC's Everio GZ-MG20 ($800) features a 0.680-megapixel CCD and a 20GB hard drive that provides up to seven hours of recording time at what the manufacturer describes as "DVD movie-quality video" in MPEG-2 format (the actual bit rate is 8.5Mb/s). The model GZ-MG30 ($900) bumps storage up to 30GB and recording time to 10.5 hours.

The higher-end models GZ-MG40 and GZ-MG50 ($900 and $1,000, respectively) feature larger image sensors (1.33 megapixel CCDs), which allows them to capture still images at resolutions as high as 1152x864 (JPEG file format).

Video and still files can be transferred to PC via a USB 2.0 port. Analog video can be output to a television or dubbed to a VCR. All four models are equipped with a 2.5-inch flip-out LCD and weigh just 14 ounces.

SUPER-BRIGHT PROJECTORS

When you want the big picture, nothing's better than a video projector. The devices have one major drawback, however; they need a big screen to project on. But Sanyo claims its new line of portable LCD projectors offer such high contrast that they can project onto a blackboard.

According to Sanyo, the Blackboard mode on its new models PLC-XU70, -73, and -76 will automatically adjust the image's white balance and gamma correction to project an intelligible image on almost any surface. While it's unlikely you'd enjoy watching a movie projected on a blackboard, the promise that you can see any image at all on such a dark, nonreflective surface is intriguing.

All three models deliver a native resolution of 1024x768, but are also capable of handling HDTV modes up to 1080i using component video cables. They also feature a new lamp technology that doesn't require a cool-down period: You can transport the projectors as soon as they're powered off.

Preview

Quake 4 and Call of Duty 2

Activision recently invited *Maximum PC* in for an "eyes-only" briefing and some hands-on play time with two of the hottest games due out this year: *Quake 4* and *Call of Duty 2*. Now we've been given level G14 clearance to share the intel with you.

—JOSH NOREM

QUAKE 4

It's been way too long since we kicked some Strogg ass, so we were totally stoked about the opportunity to romp through a bit of *Quake 4's* single-player mode. *Quake 4* picks up where *Quake II* left off, during the invasion of Stroggos. We dig the guns-a-blazin' gameplay in the latest edition, and encountered a number of plot twists that should breathe new life into the franchise.

The Strogg are still cranky as ever.

The game is in development at Raven Software, and will use the *Doom 3* engine—a choice that leaves the game looking a lot like, well, *Doom 3*. The engine has been tweaked, however, to allow for expansive outdoor areas and orgies of mayhem and destruction—a marked departure from the cramped, indoor, one-on-one battles that *Doom 3* offers.

Gameplay is straight-up *Quake*-style and will appeal to anyone with an itchy trigger finger and a hankering for "shoot first—and then shoot again" first-person action. Expect a squad of fellow soldiers to battle the Strogg alongside you, with an occasional solo or vehicular mission involving hover tanks and mechs.

The official line is that the game will be released "when it's done," but our Spidey sense tells us we'll be hip-deep in Strogg blood this holiday season.

CALL OF DUTY 2

Call of Duty has become the de facto standard for WWII-based shooters, and based on our hands-on play test, we predict the sequel will be even better. The developers at Infinity Ward are intent on keeping the sphincter-clenching gameplay intact, but from what we saw, they're improving practically everything else.

The game's most significant enhancement comes in the form of an all-new "made from scratch" 3D engine (the original game was built on the *Quake III* engine). The new engine is equipped with a wicked particle system that makes smoke and explosions look incredibly realistic. *Call of Duty 2* will move away from being a linear "on rails" shooter in favor of multiple objectives you can tackle in any order; you'll even be able to jump between campaigns.

***CoD 2's* new 3D engine looks spiffy.**

As brief as our experience with *Call of Duty 2* was, we pushed away from the desk with racing hearts and sweaty palms: The action was loud, bombastic, and nerve-racking—just the way we like it!

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Josh Norem
Explores the Dangers of Tap Water

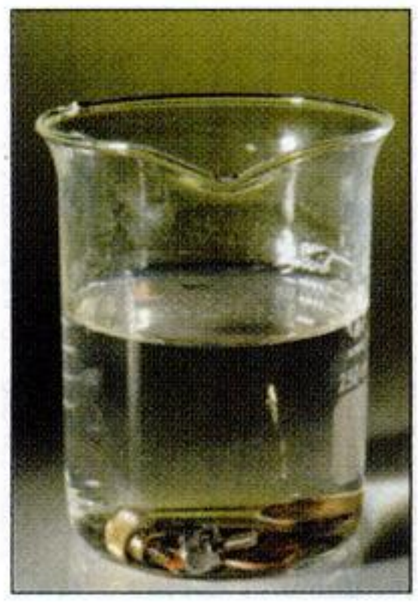
I knew tap water was bad for water cooling, but I didn't know how bad

If you just built a water-cooling rig and filled it with tap water instead of using that "fancy-colored water" you might want to rethink your position. While the debate is still raging about distilled water vs. Prestone vs. Water Wetter, one thing everybody seems to agree on is that tap water is just plain bad for water-cooling setups.

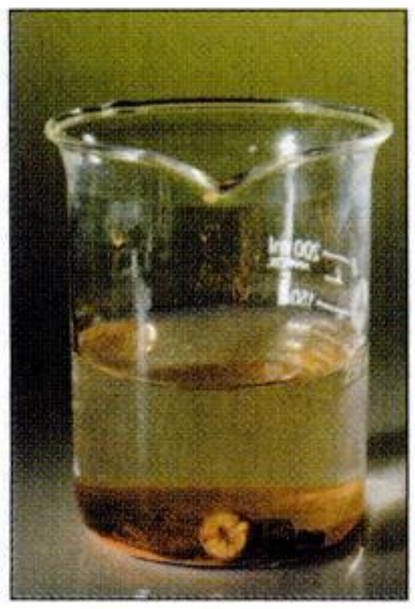
First things first: Tap water is full of impurities. Though tap water is filtered for human consumption, it still contains trace elements and minerals that won't harm you but will react with the metal in your rig's water blocks, causing corrosion. To demonstrate this I placed pennies and thumbscrews in a couple of beakers. Then I filled one beaker with tap water and the other with distilled water, which is almost 100 percent pure.

The results speak for themselves. Obviously, the pennies and thumbscrews in the tap water suffered extreme corrosion while the beaker of distilled water looks practically unaffected. Imagine what all that sediment running through your blocks, radiator, and pump would do to your rig!

Distilled water isn't perfect, however. While there's no visible corrosion, you can see minute signs of biological growth. I asked Tim Hunting from Koolance what, aside from distilled water, should be used in a water-cooling setup and this was his response: "Performance-wise, straight water will provide the best temperatures. The more glycol, alcohol, or whatever else a user might be mixing in, the lower the coolant's heat capacity or thermal conductivity will be. Despite this, some amount of anti-corrosion and anti-biological agents are needed if impurities make it through the distillation process or are introduced by the cooling components themselves."



We don't see any corrosion in our beaker of distilled water, though we can see a little bit of biological growth taking place.



Yuck. The impurities in tap water are launching an all-out assault on the copper plating of several pennies!

So, what's the solution? Ask any vendor and they'll recommend their very own premixed solution, which typically is distilled water mixed with anti-algae, corrosion inhibitors, and some form of biocide. If you're looking to create your own DIY blend, we recommend playing it safe by using no more than 20 percent additives to maintain high flow rates and good temperatures.

Gordon Mah Ung
ENABLES SLI ON INTEL'S 955X

Why can't Intel and nVidia just be friends?

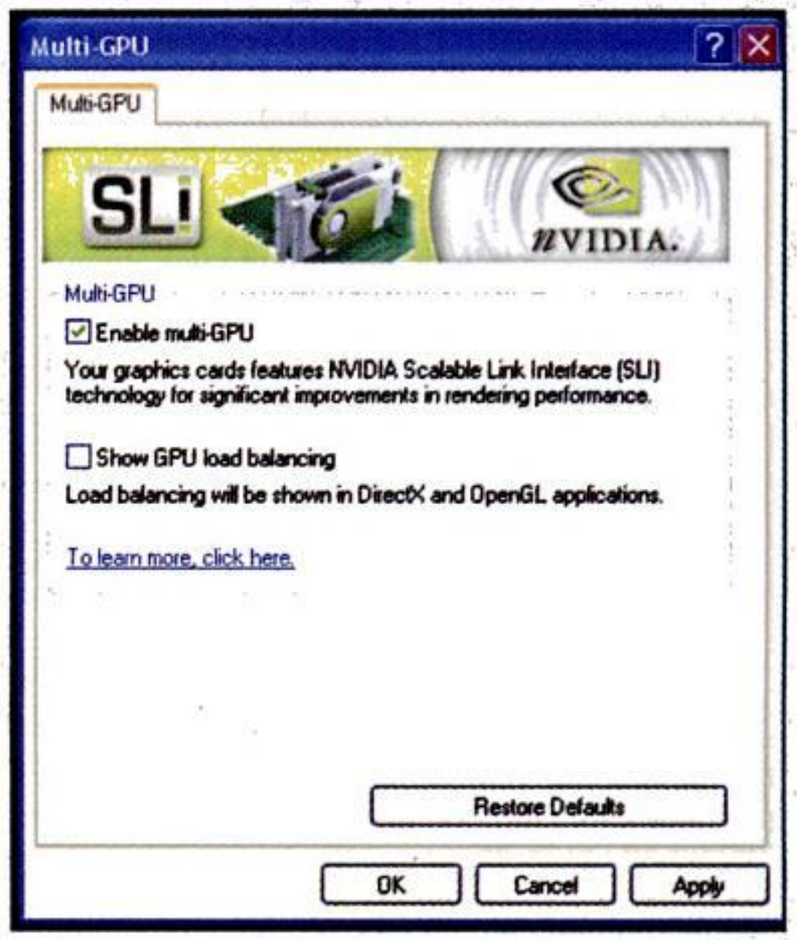
If you've read this month's Head2Head (page 16), you know how frustrated I am over the situation regarding dual PCI-E graphics cards. If nVidia used Intel's Xeon CPU and chipsets as a development platform for SLI, why the hell won't two nVidia graphics cards work in tandem on an Intel 955X board with two x16 slots, such as Asus' P5WD2 motherboard?

It begs the question: Is this a technical problem or a marketing problem? Intel declined to comment on the SLI/955X situation and nVidia said it's "still working" with Intel on the matter. Could I make SLI work on the P5WD2 without the vendors' blessing?

Mebbe. I installed a pair of nVidia GeForce 6800 cards in the P5WD2, and with the current 77.72 Forceware drivers, both cards worked! But sadly, the option to enable SLI wasn't available. I wondered if pre-955X drivers might be the key. After digging up the 66.72 drivers, I rebooted the system and crossed my fingers. And voilà! The older drivers prompted me to enable SLI. The only problem was that anytime I fired up a 3D game, it locked. Bah!

It's clear to me that the problem is more marketing than technical. I don't think nVidia wants to give SLI to Intel, at least not for free. And with a long history of antagonism between the two companies, the stalemate isn't likely to end any time soon.

So here's how it stands: Instead of picking a motherboard and having any graphics option open to you, you now have to pick your graphics cards and tailor your motherboard around it. Even worse, you can't switch graphics should the performance lead switch, from nVidia to ATI or vice versa. The situation, in a word, sucks.



Proof: With older drivers, you *can* enable SLI on 955X boards, even though it won't run games.

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How We Test

Real-world benchmarks. Real-world results

PC performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC*, our mantra for testing has always been "real-world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six real-world benchmarks that we use to test every system we review.

SYSmark2004: This is the most comprehensive application benchmark available, using no fewer than 19 applications to measure the time it takes for the PC to complete to real-world computer-intensive tasks. Our *SYSmark* score is a composite based on the time the test takes to complete several different types of tasks.

Adobe Premiere Pro: The leading nonlinear digital-video editor has recently been retooled with more support for multi-threading. We take a raw AVI file, add several transitions and a soundtrack, export it to a generic MPEG-2 file, and then report the time the script takes to complete.

Adobe Photoshop CS: We don't subscribe to Apple's half-baked idea that running one filter test in *Photoshop*, in one certain way, at a particular time of day provides an accurate measure of performance. Instead, we take a high-resolution image and throw it through just about every filter available in *Photoshop CS* at it. Our score is the time it takes for the script to complete.

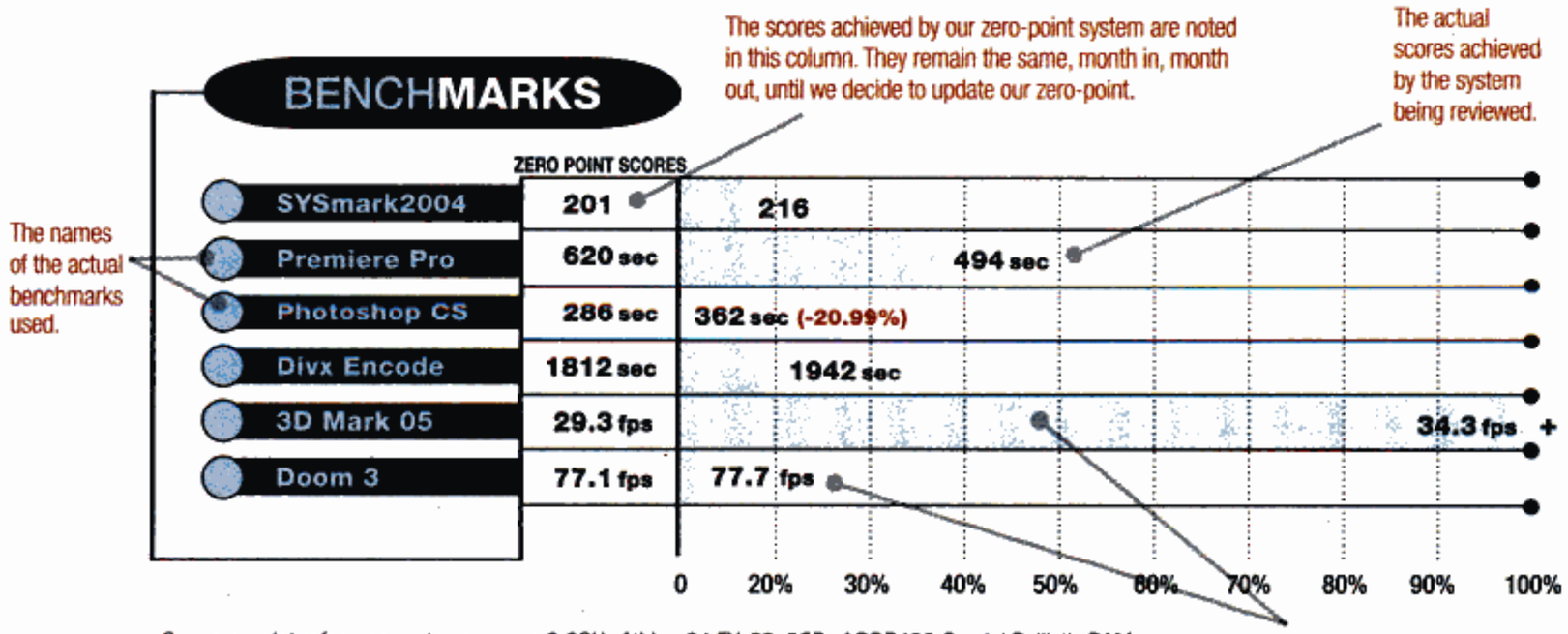
Divx Encode: Video encoding is today's time-suck. We transcode a short movie stored on the hard drive from MPEG-2 to Divx using *#1 DVD Ripper.* We report the length of time the process takes to complete.

3DMark05: After ranting about real-world tests, you might be surprised to find this "synthetic" graphics test in our suite. *3DMark05*, however, has proved to be the standard by which graphics cards and PCs that run them are judged. Instead of reporting a meaningless composite score, we run the third test at 1280x1024 with 4x antialiasing and 4x anisotropic filtering, then report the frame rate. Our zero-point system with SLI can't even break 30 frames per second.

Doom 3: Id's hugely popular game is a dark, scary, and serious test of PC horsepower. We run this game with 4x antialiasing and 4x anisotropic filtering, at 1600x1200 resolution, and report the frame rate.

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.



Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

Our monthly category-by-category list of our favorite products. New products are in red.

High-end Videocard:
GeForce 7800 GTX

Midrange videocard:
ATI Radeon X800XL

Soundcard:
We're waiting to see a final Creative Labs X-Fi before making an investment

7,200rpm SATA:
Hitachi Deskstar 7K500

External backup drive:
Western Digital Dual-Option Media Center 250GB

Portable USB drive:
Seagate Portable External Hard Drive 100GB

DVD burner:
Plextor PX-716A

Widescreen LCD monitor:
Dell 2405FPW

Desktop LCD monitor:
Dell 2001FP

Desktop CRT monitor:
NEC FE2111 SB
Due to waning interest, this category will be dropped next month

Socket 939 Athlon 64 mobo:
ASUS A8N-SLI Deluxe

Socket 775 Pentium 4 mobo:
ASUS P5ND2-SLI
See this month's Head2Head for details

Portable MP3 player:
Apple iPod 60GB

Photo printer:
Canon i9900

5.1 speakers:
Logitech Z-5500 Digital

2.1 speakers:
Klipsch GMX A2.1

Mid-tower case:
Cooler Master Praetorian 730

Full-size case:
ThermalTake Armor VA8000BWS

Games we're playing:
Area 51, Battlefield 2, Grand Theft Auto: San Andreas

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eMagin Z800 3DVisor

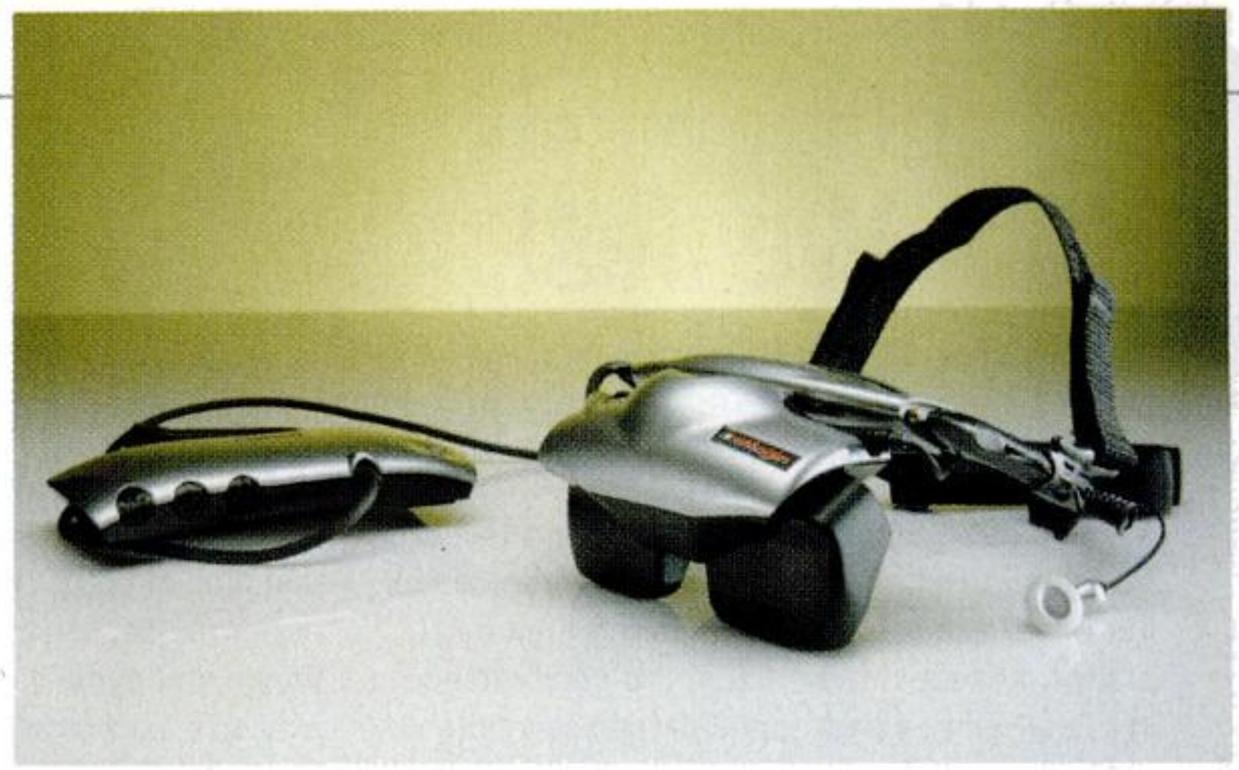
OLED micro-displays take you to the bleeding edge

We can't remember the last time we heard someone say, "What the world needs now is a good set of 3D goggles," but we're happy this apparent lack of demand didn't stop eMagin from designing the best 3D goggles we've ever tested.

Technically, the Z800 3DVisor isn't a pair of goggles; rather, it's a pair of OLED (organic light-emitting diode) micro-displays that you wear on your head like eyeglasses. The unit also includes a pair of stereo earbuds, a noise-canceling microphone, and a head-tracking mechanism. It's more than just an expensive toy, but you might have difficulty convincing other people of that: With a $900 price tag, it's definitely expensive; and most buyers will just use it for gaming. But that's not its *only* application. Honest.

OLED displays are known for excellent contrast and superb color saturation, and the ones inside the Z800 deliver just that: They're bright, vibrant, and completely capable of displaying everything from movies to fast-action games without smearing or stuttering. Although each display measures just 0.59 inches diagonal, eMagin claims that their near-eye proximity delivers a picture equivalent to a 105-inch screen viewed at 12 feet. The claim sounds a little fishy, but we really did feel as though we were sitting in primo seats at a good movie theater.

Each of the micro-displays inside the Z800 can display maximum resolution of 800x600 pixels. We didn't find this limited resolution to be a significant drawback, but eyeglass-wearing editors quickly discovered that they couldn't get by without their specs; and people who wear progressive bi-focal lenses had real difficulty reading text on the Z800.



The headset portion of eMagin's Z800 3DVisor consists of twin OLED micro-displays, stereo earbuds, and an integrated mic.

You can plug in your own headphones or earbuds if you don't like the sound of the Z800's built-ins.

A SECOND DISPLAY

If you're a frequent flyer (and can tolerate stares from curious fellow passengers), you could work—or watch movies—on your laptop without worrying about snoops leaning in for a peek. Use it as a secondary monitor, and you can do anything that's possible with a twin-head videocard and two monitors.

Activate the head-tracking mechanism and you'll transform your melon into a mouse, controlling the cursor with 360 degrees of freedom as you tilt and turn your head. Playing games with head-tracking enabled involves a learning curve: The device is responsive enough that you can use head-tracking to determine your direction of movement (turn your head left in a shooter, for example, press the W key, and you'll walk to the left).

We were surprised to discover, however, that this didn't feel as natural as manipulating a mouse. But then we dialed the head-tracking sensitivity way back and found that turning our heads slightly enabled us to change our view—and effectively target enemies—without significantly changing direction. And this, in combination with the game world filling our entire field of view, immersed us in games better than any device we've ever tried.

The visor is hardwired to its control module, which houses brightness, power, and standby buttons, along with ports for power, USB, headphones, mic, and video in/out. The visor draws power through the USB port.

SO WHERE'S THE 3D?

So where does the "3D" in "Z800 3DVisor" come in? The device doesn't require specific support from games and other applications to display 2D images; to produce 3D images, on the other hand, the Z800 must be paired with a videocard capable of producing frame-sequential (page-flipping) stereo.

When operating in this mode, the videocard renders unique views for each eye and alternates between the two views in rapid succession. The Z800, in turn, alternates between the left image in the left eyepiece, while blanking the right screen, at a rate of 60 frames per second (60Hz). Persistence of vision melds the two alternating images to produce a three-dimensional view.

As we went to press, nVidia's GeForce series cards are the only consumer videocards capable of producing frame-sequen-

SPECS

DISPLAY TYPE	Dual OLED micro-displays
RESOLUTION	800x600
AUDIO	Stereo earbuds, integrated mic
I/O PORTS	VGA in/out, USB, mic out, headphone in
2D COMPATIBILITY	Any videocard
3D COMPATIBILITY	nVidia GeForce only

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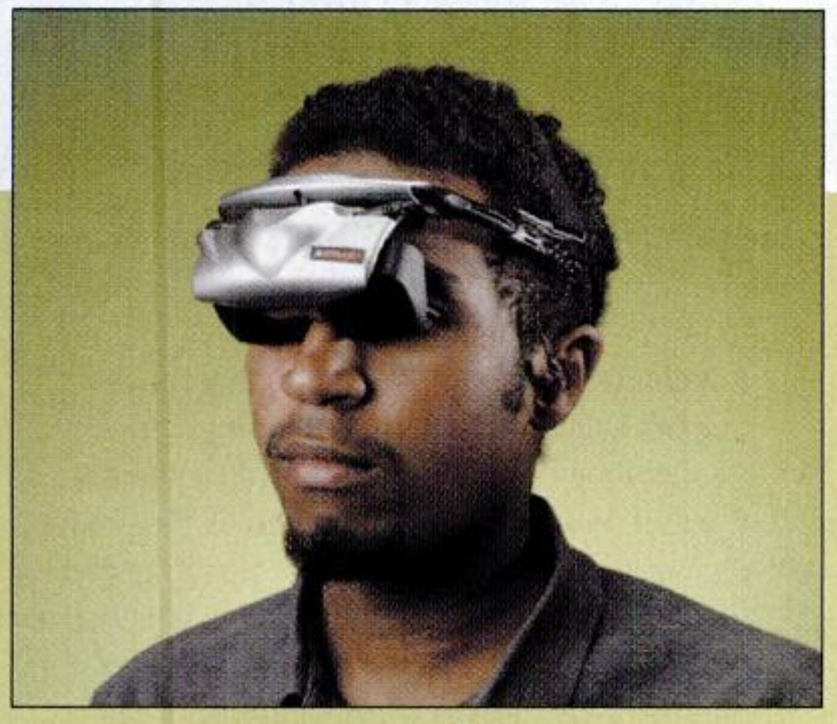
tial stereo. Unfortunately, even the nVidia drivers have a couple problems that might or might not be resolved by the time you read this: First, nVidia tells us that if you install its 3D Stereo driver, the Forceware driver you're using must be of the same version number. As of this writing, the latest Forceware driver was version 77.72, but the latest 3D Stereo driver was only version 71.89.

The second problem has to do with games: In order to resolve visual anomalies with games running in frame-sequential stereo mode, you must go through the tedious process of creating custom configurations for each title. A long list of configuration files is included in nVidia's 3D Stereo driver, but these are all for older games—and we're talking about games older than *Far Cry*.

nVidia says it plans to bring the 3D Stereo driver back into sync with its Forceware driver effective with version 77.77. The company is also committed to creating new game-configuration files for 3D Stereo; but anyone contemplating purchasing a Z800 for 3D gaming should plan on creating their own files, just in case. As for ATI, reps for the company were unable to tell us at press time whether there are plans to support frame-sequential stereo in ATI videocards.

When contemplating a product like the Z800 3DVisor, you have to ask yourself just how close to the bleeding edge of technology you're willing to venture. This device makes a terrific 2D display for both entertainment and productivity apps. Playing games on the Z800 is a blast, once you get over the head-tracking learning curve. Its 3D performance in games, on the other hand, is something of an unfulfilled promise. At least for now.

–MICHAEL BROWN



Wave your geek flag high! The Z800 3DVisor is comfortable to wear even for long stretches.

EMAGIN Z800 3DVISOR

ORGANIC

Best use of OLED technology we've seen to date.

TITANIC

Expensive; 3D mode compatible only with nVidia videocards and requires custom game configs.

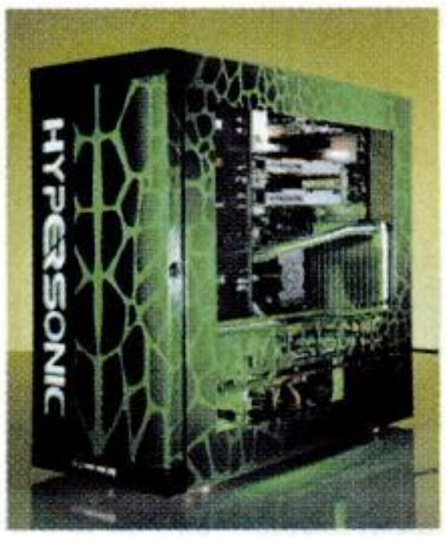
7

$900, www.emagin.com

Hypersonic Cyclone OCX Limited Edition

It blew away our benchmarks, and stole our hearts

We're acknowledged hardware snobs, so we readily admit it takes something special to make us take a step back and say, "Wow." We'll also admit that Hypersonic's luscious Cyclone OCX Limited Edition made us do just that.



Though Hypersonic has always sent impressive systems for review, the company has upped its game this time around. Special touches abound, from the glossy leopard-print paint job to the rubber-coated door hinges (for silent operation) to the mirrored case interior, everything about the Cyclone is elegant, fancy, and dare we say, swank.

Looks aren't everything, though; the hardware is what really matters. Thankfully, the Cyclone doesn't fall short in this respect either. Even though we saw most of these parts debut last month in Monarch's Nemesis—including the Athlon FX-57 CPU and GeForce 7800s in SLI—it's a payload that churns through games like a Pentagon supercomputer running nuclear war simulations. Adding a bit more bite to its bark is the fact that Hypersonic "TurboClocked" this bad boy, taking the CPU from 2.8GHz to 2.88GHz, the graphics core clock from 430MHz to 490MHz, and the graphics memory from 600MHz to 649MHz. The MSI motherboard sports a quaint gig of DDR400 memory (rated for 550MHz operation), and storage duties are handled by two 74GB Raptors and a 400GB Barracuda.

This incredible hulk pairs pristine aesthetics with bleeding-edge technology.

We expected the Cyclone to rock our benchmarks, and rock them it did. Its score of 233 in *SYSmark 20004* is quite respectable and just six points shy of the score achieved by *El Jefe Supremo*—Dream Machine 10. That pitter-patter you hear is the golf clap for Hypersonic's PC. (The record is still held by the insanely overclocked Falcon Northwest P4 box we reviewed back in May, which scored 247.) The Cyclone also scored well in our other application tests, besting last month's FX-57-based Monarch in *Premiere Pro*. The Cyclone did lose to the Monarch in *Photoshop CS*, however. *Photoshop* loves RAM and the Monarch's 2GB likely gives it the edge over the Cyclone's 1GB.

Thanks to a pair of oh-so-sweet GeForce 7800 GTX cards (in SLI, of course), we finally broke the 100fps barrier in *Doom 3*, with the Cyclone clocking an average 102.1fps. That gives the Cyclone the record in that benchmark. The Cyclone also ripped apart the Game 3 benchmark in *3DMark05*, scoring 90 percent faster than our 6800 Ultras-in-SLI zero-point rig.

Like the calm before a storm, Hypersonic's Cyclone is whisper-quiet despite all the power raging under its hood. This can be attributed to its HydroX liquid-cooling system, which is a customized version of Cooler Master's Aquagate Mini 120. Hypersonic blinged-out the Mini's boring black tubing with silver sheathing and added a custom shroud to the radiator for improved performance.

Like a mean, green hot rod, the Cyclone is certainly a force to be reckoned with. It's a take-no-prisoners system that'll leave the faint of heart (and wallet) blowing in the wind.

—CLAUDE McIVER

UNDER THE HOOD

BRAINS	
CPU	AMD Athlon 64 FX-57
MOBO	MSI K8N Neo4 Platinum/SLI
RAM	1GB Mushkin DDR550
LAN	Dual Gigabit
HARD DRIVES	400GB Seagate Barracuda (7,200rpm SATA, 8MB cache), two 74GB Western Digital Raptor (10,000rpm, 8MB cache) in Raid 0
OPTICAL	Plextor 16X DVD±RW Dual Layer
BEAUTY	
VIDEOCARD	Two GeForce 7800 GTX 256MB
SOUNDCARD	Sound Blaster Audigy 2 ZS
CASE	Reflexxion Series Stratus Aluminum Case in Python Green Metallic with Enermax 600W PSU

BOOT: 32 sec. DOWN: 13 sec.

HYPERSONIC CYCLONE OCX

LEOPARD
Fast as hell, top-of-the-line components, and a sexy paint job.

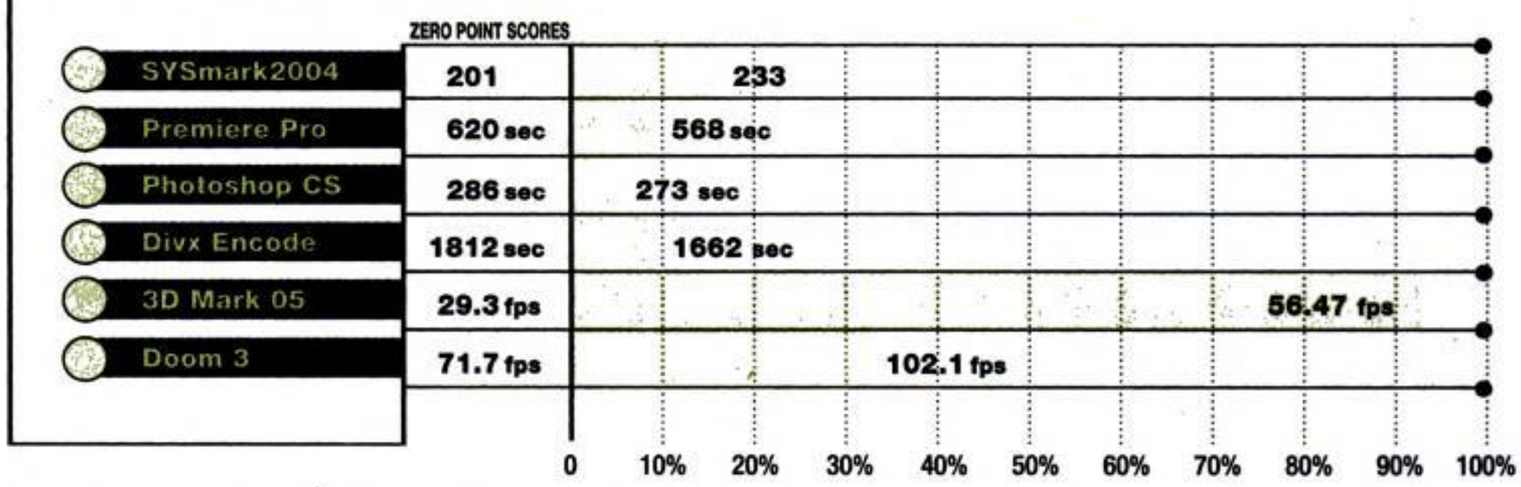
DEF LEPPARD
Only 1GB RAM, no DDR2, and a hefty price tag.

9

MAXIMUM PC KICKASS

$5,185, www.hypersonic-pc.com

BENCHMARKS



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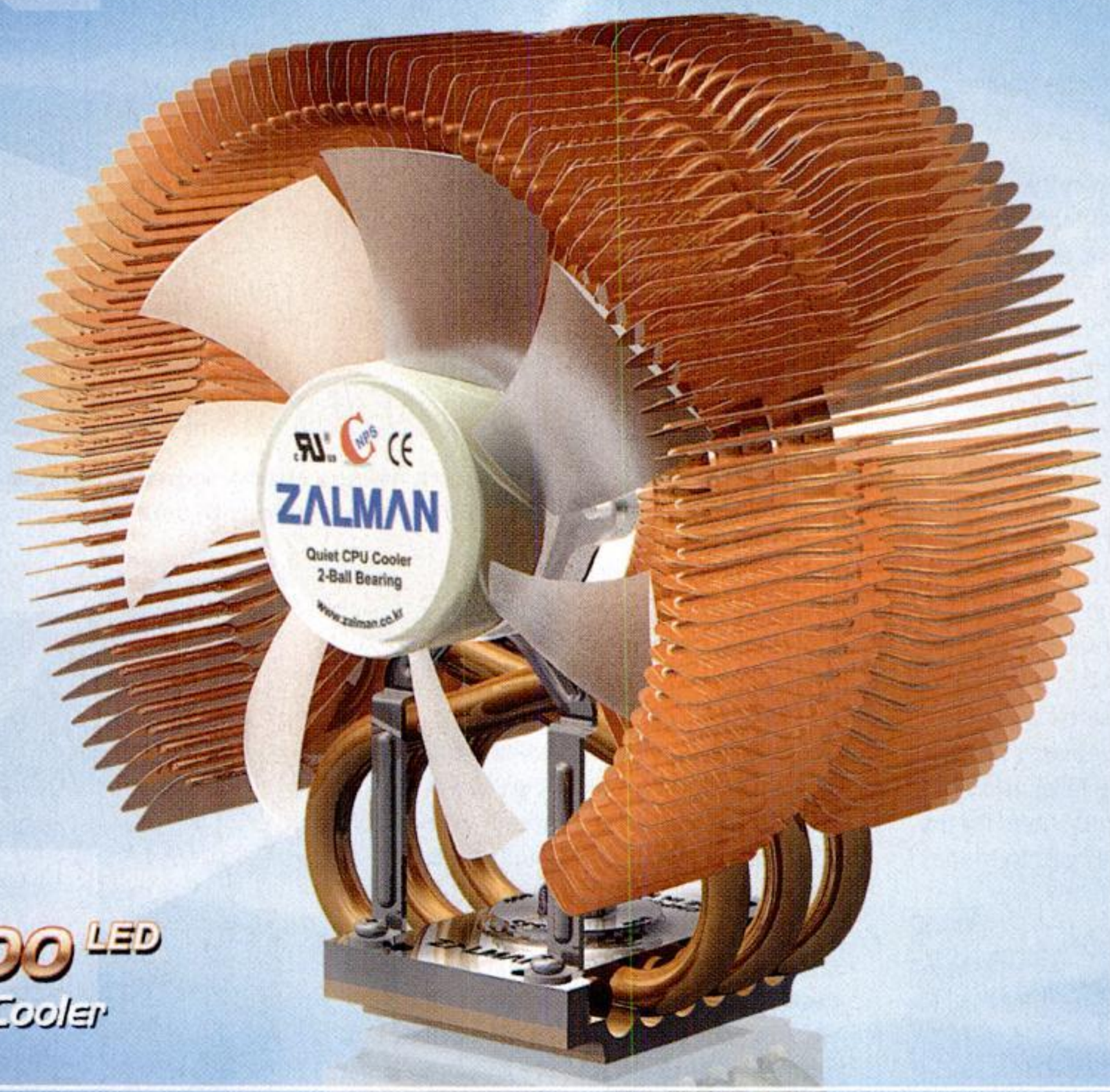
Endless Innovations

ZALMAN

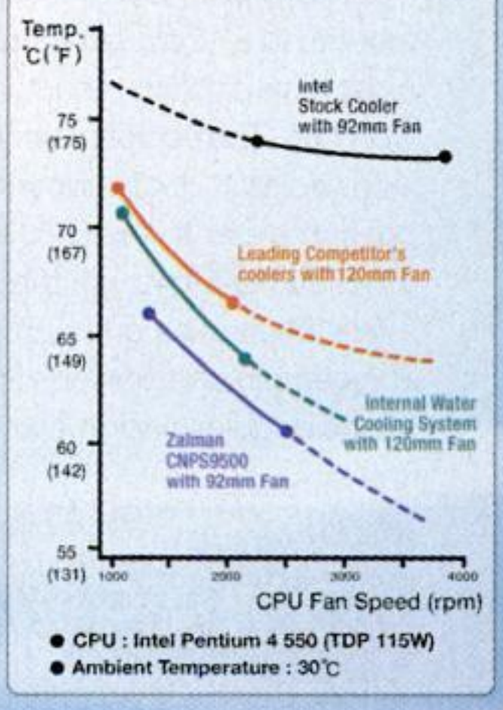
The Art of Cooling Redefined



CNPS 9500 LED

Ultra Quiet CPU Cooler

Performance Comparison Chart



- CPU : Intel Pentium 4 550 (TDP 115W)
- Ambient Temperature : 30℃

● Ultimate Perfomance

100% copper heatsink with aerodynamically optimized "tunnel" design for maximum cooling efficiency

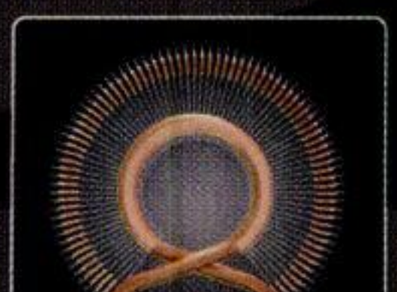
Innovative patented heatpipe bending design for a heat transfer capability equal to 6 heatpipes with just 3 heatpipes

● Ultra Quiet Operation

Ultra Quiet CNPS 92mm opaque fan with blue LEDs

Aerodynamically optimized heat sink for smooth airflow and minimal noise

● Minimized Weight



Optimized heatsink layout for maximum cooling efficiency with minimal materials

0.2mm ultra slim fins for miniminzed weight and reduced airflow resistance

● Broad Compatibility

Intel Pentium 4 (Socket 775/478)

AMD Sempron/AMD64 (Socket 754/939/940)

Specifications

Dimensions (L X W X H)	85 X 112 X 125 mm (3.35 X 4.41 X 4.92 inch)
Heatsink Material	Pure Copper Base Pure Copper Fins Pure Copper Heatpipes
Weight	498g (17.56oz)
Dissipation Area	3,498cm² (542.19 inch²)
Fan Size	92 X 25 mm (3.62 X 0.98 inch)
Fan Operating Voltage	5~12V
Rated Current	0.35A
Max. Power Consumption	4.2W
Bearing Type	2-Ball Bearing
Fan Speed	1,350 - 2,600rpm ±10%
Noise Level	18.0 - 27.5dB ±10%
Connector	3-Pin
Fan Speed Controller	FAN MATE 2

COMPUTER NOISE PREVENTION SYSTEM

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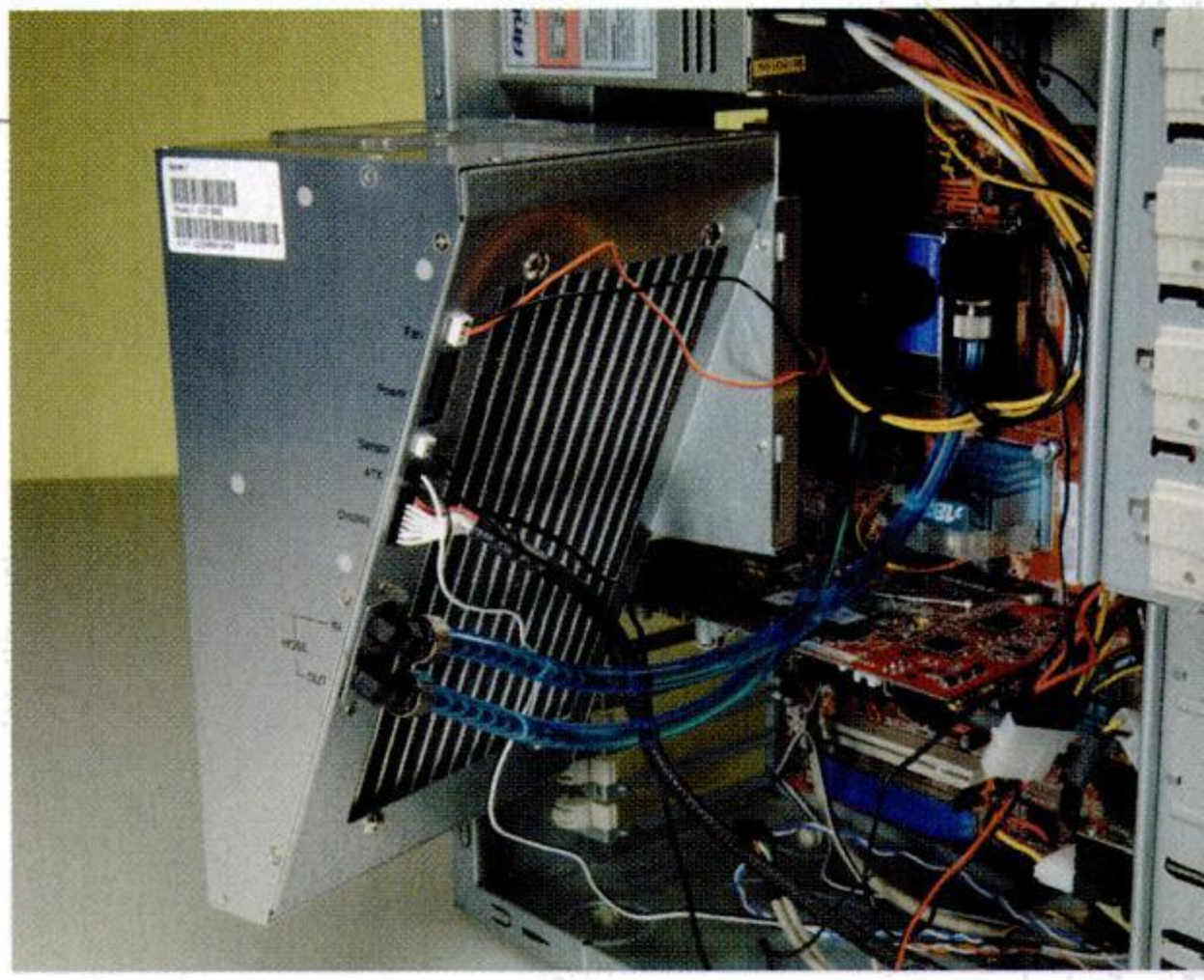
Koolance Aquian ICM-505

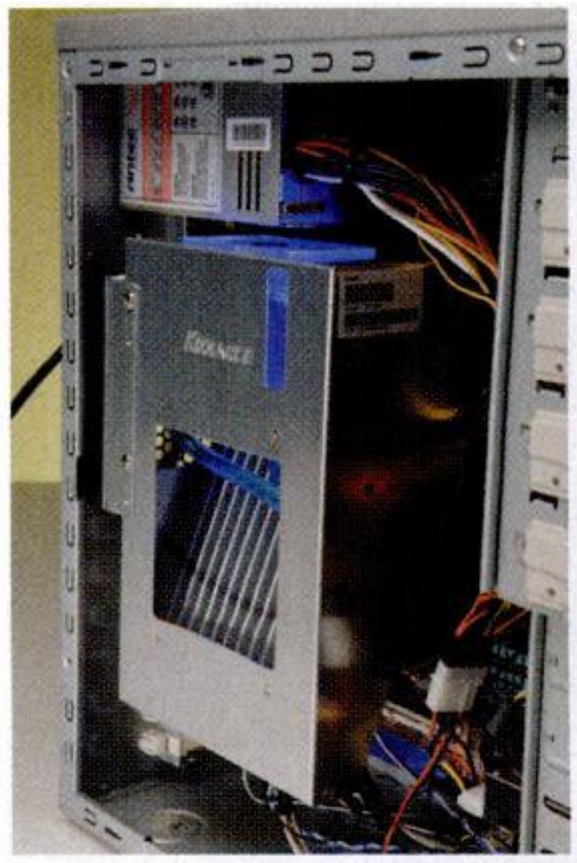
A superb way to add water to your rig

The Aquian is a revelation in that it's an internal water-cooling kit that offers the same level of performance as an external unit without having a big-honkin' radiator and fan outside your case. And unlike the other internal kit we tested—Cooler Master's Aquagate Mini (May 2005)—you can add more water blocks to this kit at some future date. We dare say, the Aquian is the answer to our water-cooling prayers.

The Aquian is a self-contained kit that mounts to a 12cm fan mount (your case *must* have a 12cm mount; an 8cm or 10cm won't fit). The enclosure contains a 5x10-inch radiator, dual submersible pumps (one pushes water to the CPU block while the other sucks it through the radiator, providing a failsafe in case one pump fails), a blue LED-lit reservoir, and power connections for the kit. Its angular design allows you to mount it inside most cases without touching any components. It can even be adjusted up and down an inch and a half to accommodate different cases and mobos. We didn't experience any blockage issues with either our AMD or Intel test rigs, though the case interior was very cramped in both setups.



The Aquian swings out 90 degrees from the case for maintenance or to allow you to fiddle with your system's innards.



The Aquian fit just fine in our test case, but be sure to check Koolance's website for a list of compatible cases prior to purchase.

Fan speed can be changed manually or set to Auto via this 3.5-inch LCD display. It includes a preset alarm and allows you to adjust system shutdown temps (in case of pump or fan failure).

Two 1/4-inch tubes go from the pumps to the CPU water block, which is included and fits all late-model CPUs (Xeons require an additional adapter). Though water-cooling aficionados may scoff at such a skinny tubing diameter (1/2-inch and 3/8-inch are the norm), it's necessary because the entire apparatus swings out 90 degrees from the case to allow you to fill the reservoir and work in your system. The swing-out design requires a lot of slack in the lines and larger tubing would kink where the skinnier, more flexible tubing doesn't. Cooling performance suffers a tad because of the thin tubes, but temperatures and overclocking performance are still excellent.

Once the CPU water block is attached—an easy affair, although it does require motherboard removal on LGA775 rigs—a 3.5-inch LCD system monitor mounts in a free bay and displays the temp reading from the water block (Koolance recommends you use a third-party software utility to monitor your CPU temperature). Unfortunately, the probe is too far from the core of the water block to give an accurate reading. Fan speed is controlled by the LCD unit, which you can set to Auto or Manual. In auto mode, fan speed varies incrementally depending on the temps reported by the probe. In manual mode you control fan speed with a couple buttons on the panel. We prefer the auto mode; it worked perfectly in our tests, ratcheting fan speed up as the temperature increased. The system also has a built-in alarm that sounds at 55 C and cranks the fan to 100 percent. If temps increase another 3 C it shuts off the whole system. You can manually adjust alarm and shutdown temperatures.

The Aquian isn't a perfect 10—its cooling performance isn't as good as other units we've tested. And it can make your case interior *very* cramped, especially in a mid-tower full of hardware. Still, it's unbelievably quiet and performs very well—almost as well as the Koolance Exos 2, which costs twice as much and requires a huge external radiator!

—JOSH NOREM

BENCHMARKS

	KOOLANCE AQUIAN	STOCK COOLER
AMD FX-55		
IDLE		
FAN LOW	**36 C**	N/A
FAN HIGH	**34 C**	40 C
100% LOAD		
FAN LOW	**46 C**	N/A
FAN HIGH	**43 C**	54 C
OVERCLOCKED TO:	**2.9GHz**	2.7GHz
INTEL LGA775 3.6GHZ		
IDLE		
FAN LOW	**42 C**	N/A
FAN HIGH	**37 C**	44 C
100% LOAD		
FAN LOW	**57 C**	N/A
FAN HIGH	**55 C**	63 C
OVERCLOCKED TO:	**4.18GHz**	4.0GHz

Best scores are bolded. All temperatures were measured from the onboard sensors using the utilities provided by the motherboard manufacturer. Idle temperatures were measured after 30 minutes of inactivity and full-load temps were achieved by running CPU Burn-in for one hour.

KOOLANCE AQUIAN ICM-505

+ INTERNAL KIT
Easy to install, maintains chilly temps, and can be expanded to suit your PC's evolving needs.

− INTERNAL BLEEDING
Can make a mid-tower very cramped.

9

MAXIMUM PC KICKASS

$220, www.koolance.com

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Record TV on your PC

PC Magazine Editor's Choice, April 2004

"Proving that a PC can Rival TiVo" (Associated Press, 03/04) SnapStream Beyond TV puts you in control of your TV experience. Watch recordings when and where you want to watch them -- on the living room TV, on your laptop or on a Pocket PC. Leverage the power of your PC to record multiple shows at once and to stream TV over your wireless network. All with no subscription fees.

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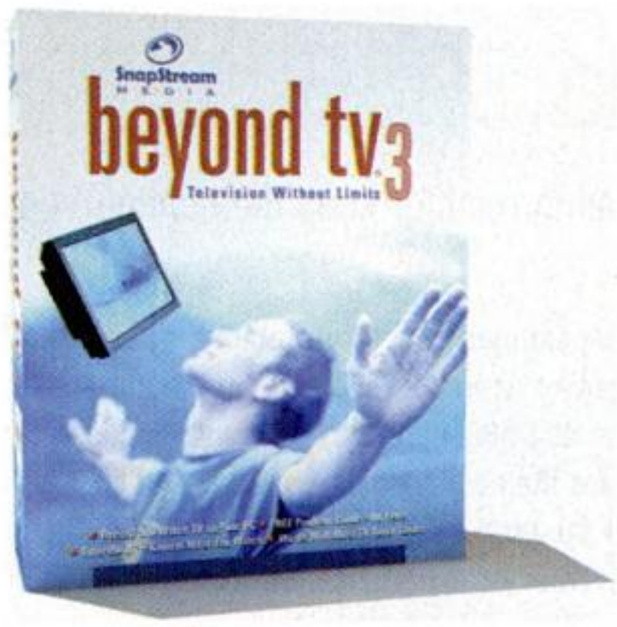

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Shuttle SB86i

Can a BTX small formfactor keep the Pentium 4 cool?

The SB86i looks good but can't run dual core CPUs

BTX is the Rodney Dangerfield of formfactors: It just doesn't get any respect from power users. But the new formfactor finally gets some love from Shuttle in its SB86i bare-bones PC, which doesn't just embrace BTX, it French-kisses the new spec. Theoretically, BTX sucks cool air in the front, blows it over the processor, and vents it over the chipset and video-card for a quieter, cooler PC experience. But does it?

Firing up the SB86i with a 3.8GHz Pentium 4 570 installed, we found it to be the quietest P4-based SFF box we've ever had in the Lab. Its acoustic signature was quite acceptable under all but the heaviest processor loads. It's no Pentium M system, but it's not bad—for a P4 SFF, that is.

Structurally, the SB86i is sturdy and doesn't exhibit any of the flexing we've seen in other SFF boxes. (Shoot, some SFF machines give you all the confidence of trying to ride out a tornado inside an aluminum shed.) Styling on the SB86i is also quite smart, and Shuttle manages to keep the face of the unit free of button and port clutter. Shuttle even manages to tuck a multifunction memory-card reader on the right-hand side.

Our main beef with the SB86i is its sketchy PCI-E graphics support. Shuttle doesn't spell out what add-in cards you can run but the box certainly can't handle a GeForce 6800 GT-class card. We suspect it's due to the 275-watt CFX power supply, which is probably good enough to run any graphics card that doesn't require external power. Hardcore gaming, therefore, is definitely not an option with the SB86i.

The PC's 915G chipset also eliminates the option of running dual-core processors; at least its integrated graphics core can support the 3D GUI in Microsoft's next-gen OS, Vista.

So where does this leave the SB86i? In a tough spot. Yes, it's nicely styled and mostly quiet. But it can't support the latest cutting-edge components, which makes it of limited value to power users.

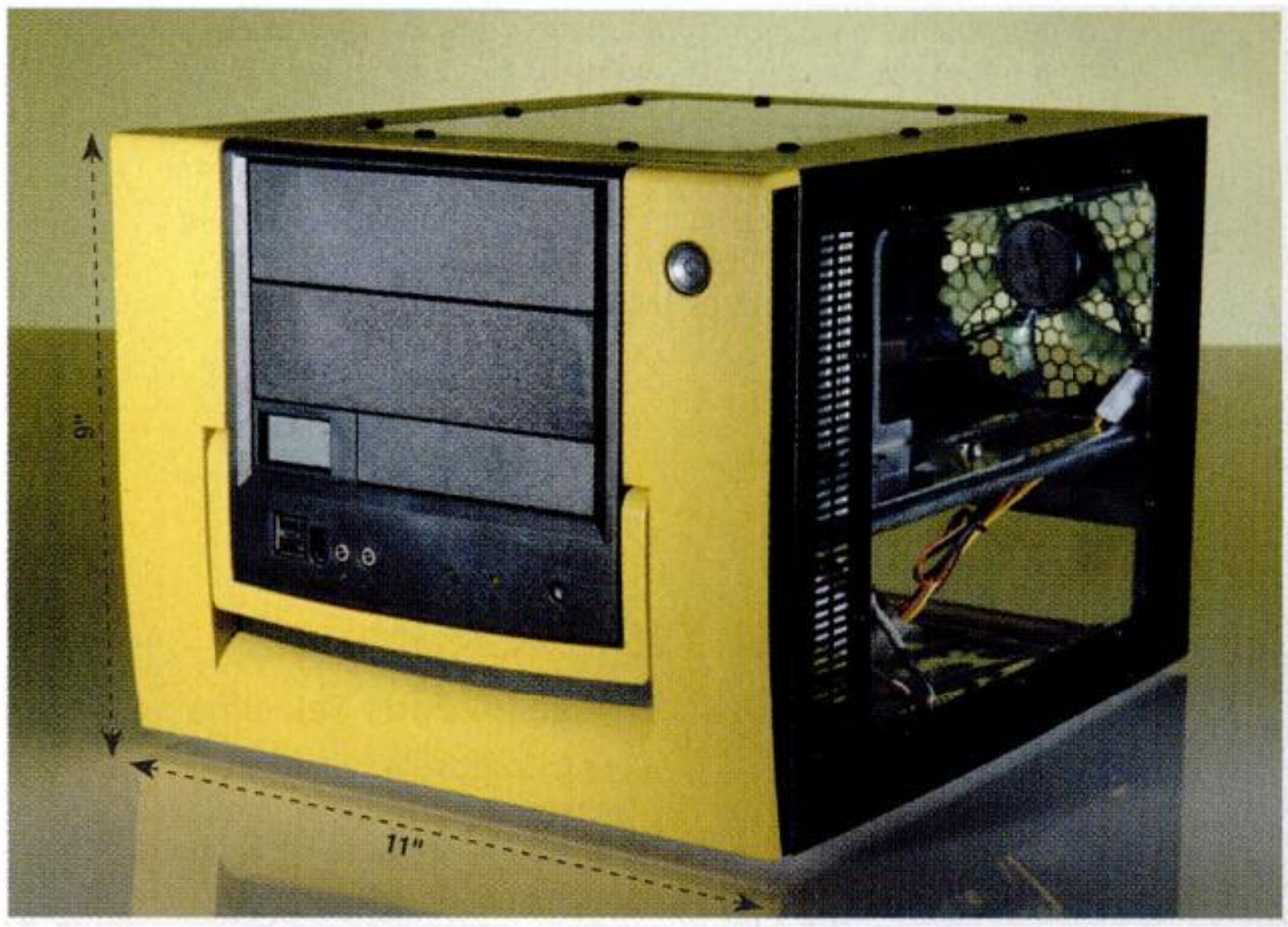
—GORDON MAH UNG

SHUTTLE SB86I **8**

$300, www.shuttle.com

Aspire X-QPack

Call it a medium-formfactor enclosure



The X-QPack's folding plastic handle is too flimsy to use

A small formfactor case is like a subcompact car: It works fine until you try to fill it up. That's likely why we're seeing an increasing number of *medium* formfactor boxes—cube enclosures just slightly bigger than SFF computers that can hold more and better hardware inside.

Aspire's X-QPack is one such enclosure that straddles the line between mini-tower and SFF. Unlike the Shuttle SB86i "bare-bones" product, which gives you a motherboard and accessories to build a system, the X-QPack is simply an enclosure that should work with any micro-ATX motherboard.

The case features a handle that tucks away when not in use. It's supposed to make it easy to carry your system to a LAN party, but we don't recommend you actually use it. The handle flexes when the case is *empty*. Drop in two 400GB drives, two opticals, and another $1,000 in hardware, and you've got a recipe for heartbreak should the handle snap while you're going up an escalator.

We built up the X-QPack using an Aopen Pentium M MicroATX mobo, 1GB of RAM, a 75GB hard drive, an optical drive, and a GeForce 6800 Ultra card. We weren't sure if the included 420W PSU could handle the load, but it worked fine. Construction was a snap thanks to the removable motherboard tray. The tray, however, is extremely easy to bend. In fact, that's our main complaint about the X-QPack: Its thin-aluminum construction is noodle soft. When the case is screwed shut it's structurally sound, but when the top is off it's a flexy flier. The X-QPack could also be improved by lengthening the entire case an inch or two. That would let you install a standard ATX PSU that offers either more wattage or a quieter profile.

In the end, the X-QPack does what it promises, but it does it with little imagination or flair.

—GORDON MAH UNG

ASPIRE X-QPACK **7**

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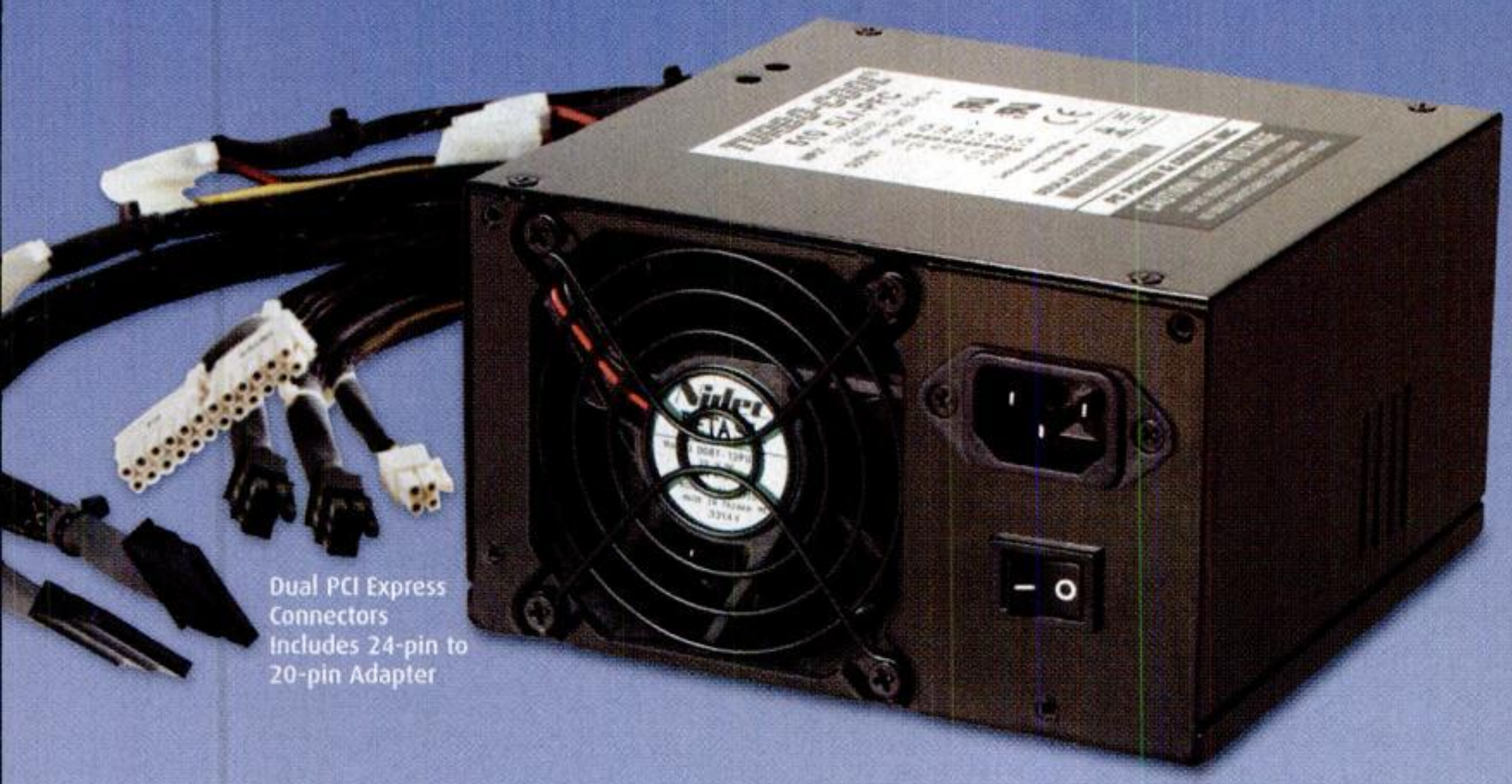
Heavyweight Champ.



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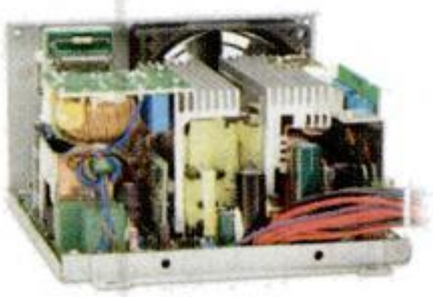

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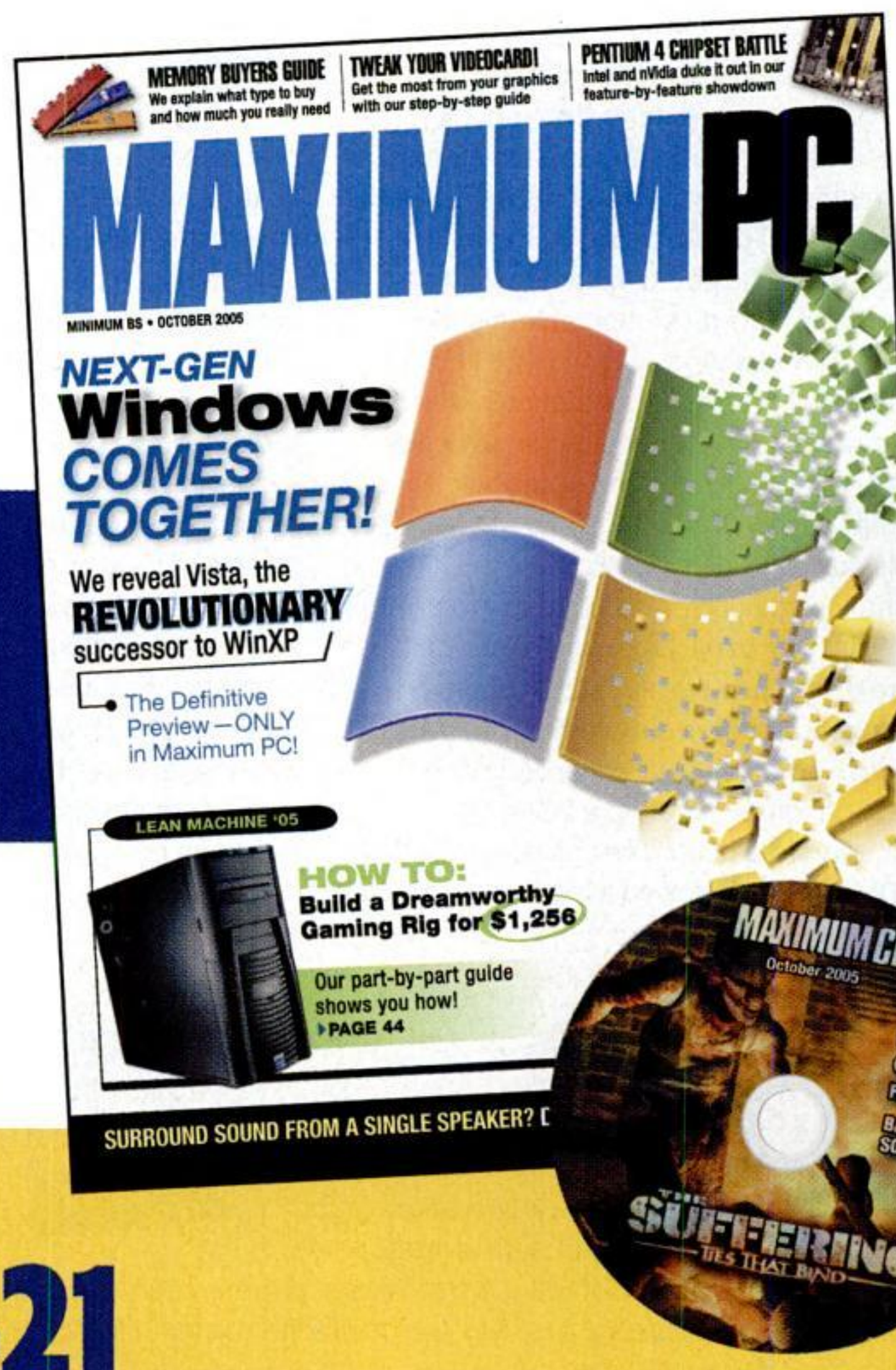
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Toshiba Libretto U105

The original miniature notebook returns

Miniature notebooks can be like small dogs. They're cute and cause people to say "*awww*" but they don't have much of a bite.

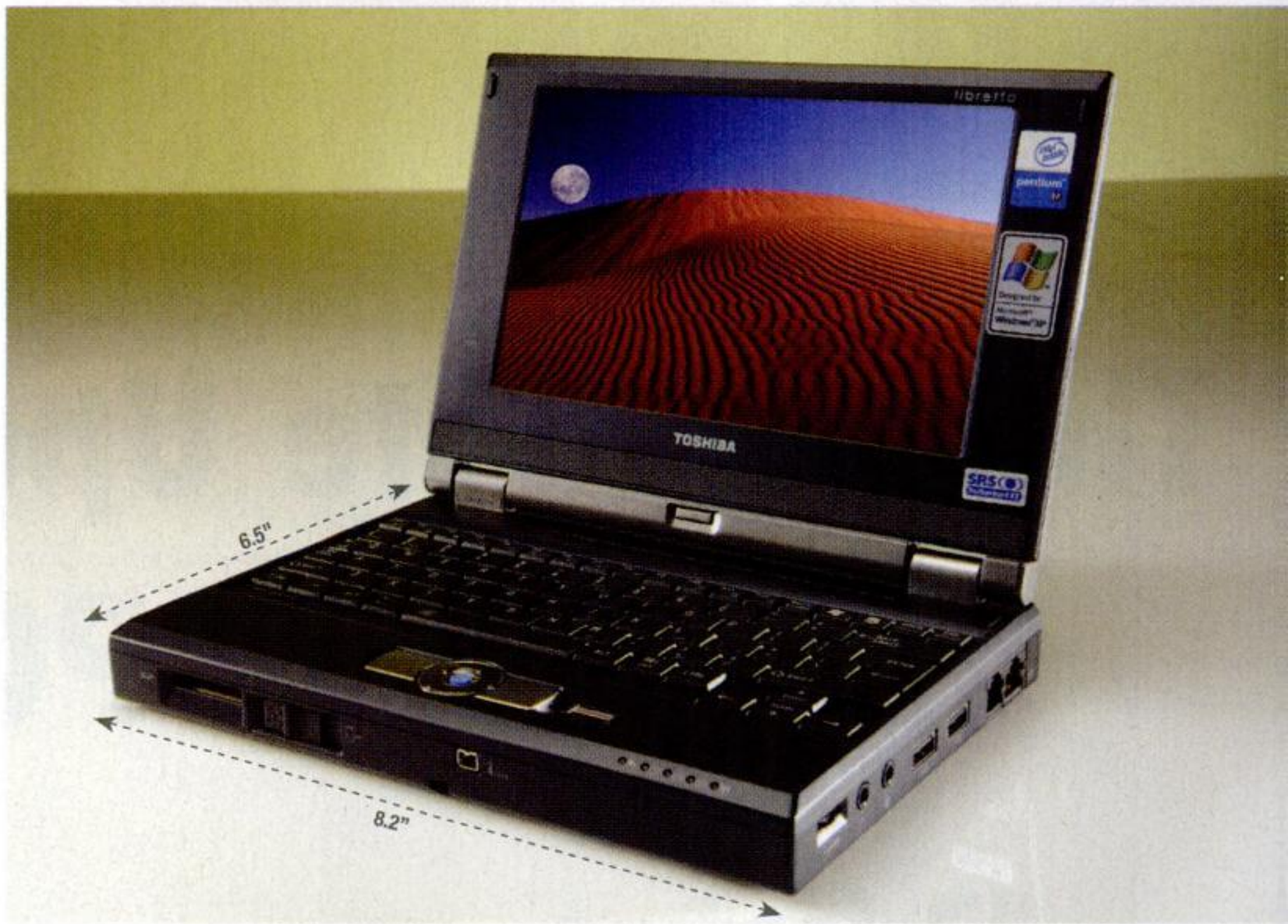
But don't assume that about Toshiba's Libretto U105, which shoehorns a 1.2GHz Pentium M, a 60GB hard drive, 802.11g, Bluetooth 2.0, a FireWire port, an SD card reader, and a biometric fingerprint reader into a computer the size of a VHS cassette.

Taking a cue from BMW's Mini Cooper, Toshiba reintroduced the Libretto to celebrate the company's 25th anniversary. Unlike the new Mini Cooper, however, which is more of an homage to the original than a reproduction, the new Libretto is a near replica of its forebear.

You get all the power of a larger notebook, but you also get the throw-back squashed keyboard that made typing an awful experience with the Libretto CT50 back in 1997. The keyboard is so small, hobbits would have a difficult time with it. We applaud high-resolution screens, but Toshiba over-reached with the 1280x768 glossy panel gracing this notebook. At 7.2-inches viewable, you need bionic eyes to actually read text when the notebook sits on your lap, even with the font size set to large.

Negatives aside, you have to hand it to Toshiba for jamming so much technology into a package this small. Most notebooks of this stature use Transmeta's 1GHz Crusoe processor, which performs more like a 400MHz Pentium II. The 1.2GHz Pentium M in the Libretto performs more like a 2GHz P4.

Battery life is good. The unit doesn't include a DVD drive, so we played a movie off the local drive to test the notebook's juice. The Libretto gave us stutter-free playback for more than three hours before the battery tapped out.



Toshiba's Libretto is a fully featured notebook that's just slightly larger than a VHS tape.

Although this class of machine isn't capable of playing modern games, it's fine for apps such as Adobe *Photoshop*. The tiny Libretto completed our *Photoshop CS* test in about 730 seconds. That's 46 percent slower than the Dell XPS Gen 2 notebook, but considering that the Dell has twice the RAM and weighs about four times as much, the Libretto's showing is still respectable.

With its built-in SD card reader and PC Card slot, the Libretto is a perfect notebook for the digital photographer on the go. At two pounds, its weight is comparable to some portable photo viewers, but with the Libretto you get a fully functional notebook to boot.

Still, the cramped keyboard and super-small screen make it difficult for us to recommend the Libretto as a primary notebook computer. A USB keyboard, mouse, and external monitor would make the Libretto handy, but who's going to haul all that stuff to Starbucks?

—GORDON MAH UNG

TOSHIBA LIBRETTO U105

+ VW BEATLE
Smallest full-featured notebook we've seen.

− YUGO FV
Keyboard is practically useless and there were 16 apps in the system tray—16!

7

$2,100, www.toshiba.com

NOTEBOOKGEAR

VANTEC LAPCOOL2

Your laptop is making you sterile! If you use your laptop while it's on your lap, the heat it creates could be overheating your "boys." Scrotal hyperthermia is not a laughing matter, people.

The LapCool2 sports a pair of USB-powered fans that circulate hot air over your laptop's underside. Unfortunately, these fans just circulate the air around the smoldering confines of your crotch, they don't actually bring cool air back into the mix. **—WS**

VANTEC LAPCOOL2 **3**

$30, www.vantecusa.com

APC UNIVERSAL NOTEBOOK BATTERY

The problem with today's high-performance gaming notebooks isn't performance, it's battery life. With average battery life well under two hours, you just can't play *GTA: San Andreas* cross-country. Unless you use the APC Universal Notebook Battery, that is. With this external battery, we more than doubled the playtime of the Dell XPS notebook. Our one gripe is that the UNB's voltage selector doesn't lock—we're nervous we'll accidentally change the setting, and fry our machine. **—WS**

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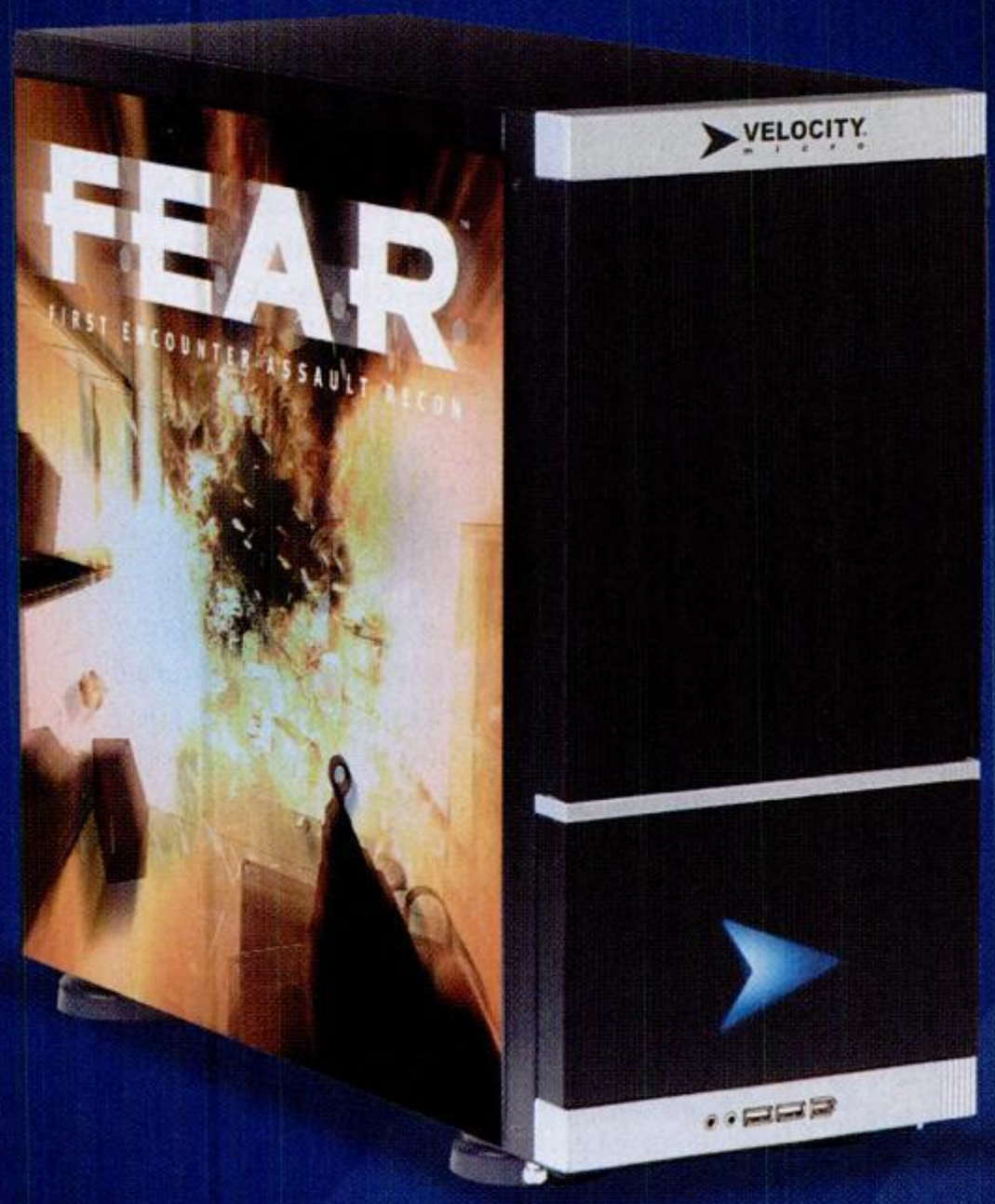

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Heatsink Hootenanny

Which heatsink/fan is cooler than the other?

Everyone needs someone to love, and every CPU needs a cooling mechanism. This month we test the reborn Golden Orb II from Thermaltake and the Nitrogon NT02 from CPU-cooling newcomer Silverstone. One is wild but quiet; the other is understated yet boisterous. What a pair!

—JOSH NOREM

THERMALTAKE GOLDEN ORB II

The original Thermaltake Golden Orb was one of the first CPU coolers to deviate from the established "aluminum brick" design, and it consequently paved the way for the onslaught of innovative CPU coolers that continues to this day. To celebrate its glorious past, Thermaltake has redesigned the Orb for today's CPUs and added LED lighting to give the device a more modern look. The Orb II is *not* a high-performance CPU cooler; rather, it's a totally silent cooler, and as such its performance is a middling.

The new Orb features a copper core with aluminum fins. A 10cm blue LED fan at its center spins at a constant 1,700rpm. It pushes 35CFM of air and is virtually silent at just 17dBA. Installation of the device was incredibly easy. Thermaltake's inadequate instructions and teeny-tiny screws have always made its coolers difficult to install, but this one was a breeze. That said, the kit includes an adhesive backplate to install on AMD systems, and once applied to your mobo it's practically impossible to remove. Thankfully, the stock backplate works just fine, so we recommend using that instead of the one provided by Thermaltake.

The Orb II is the first CPU cooler we know of to abandon older Socket 478 and Athlon XP processors. The unit is made exclusively for Athlon 64 and Pentium LGA775.

The Orb II's cooling performance is decent, but not exceptional. We like that it's quiet and easy to install, but we're miffed about the adhesive backplate. We can easily recommend several other CPU coolers that are just as quiet and offer better performance.

The Golden Orb II sacrifices all-out cooling power for sub-whisper acoustics.

THERMALTAKE GOLDEN ORB II

GOLD ORB
Very quiet and easy to install.

GOLD TEETH
Backplate is a bitch to remove; underwhelming performance.

7

$28, www.thermaltake.com

SILVERSTONE NITROGON NT02

Nobody can question Silverstone's expertise when it comes to building PC enclosures, but what in the hey-diddle-diddle does the company know about CPU cooling? As it turns out, quite a bit: The NT02 is a fantastic all-around CPU cooler, though not the best we've tested.

The NT02 adheres to traditional heatsink/fan design—it features a copper base, aluminum fins, and five copper heat pipes with sintered metal wicks to transfer heat from the base to the fins. An adjustable 9.2cm fan blasts cool air through a plastic shroud and over the fins, which also directs quite a bit of air onto the components surrounding the CPU socket. During testing, our videocard ran noticeably cooler with the NT02 than it did with the stock cooler.

Installation on the AMD platform was delightful: We simply tightened two screws and were done. The LGA775 platform, on the other hand, required that we remove the motherboard and install a backplate and standoffs. Silverstone bundles the cooler with a fan-speed controller knob, which you can mount in a 3.5-inch bay.

The 92mm fan blows through an 80mm shroud, providing cooling to the components surrounding the CPU socket.

With the NT02's fan turned all the way down it was absolutely quiet, and with the fan turned to full-blast it ran extremely loud. The unit produced respectable benchmark scores, but only with the fan cranked to max speed was it able to achieve numbers on par with CPU coolers that are much quieter, such as the Cooler Master Hyper 6 + and the Thermalright XP-90 that we reviewed in September. The NT02 has a lot going for it, but its semi-noisy nature keeps it from achieving true excellence.

SILVERSTONE NITROGON NT02

ROBBER
Great performance, classy styling, and adjustable fan.

COPPER
Performance is only super when fan is turned way up.

8

$55, www.silverstonetek.com

BENCHMARKS

	GOLDEN ORB	NT02	STOCK COOLER
AMD FX-55			
IDLE			
FAN LOW	N/A	36 C	N/A
FAN HIGH	37 C	**32 C**	40 C
100% LOAD			
FAN LOW	N/A	52 C	N/A
FAN HIGH	52 C	**44 C**	54 C
INTEL LGA775 3.6GHZ			
IDLE			
FAN LOW	N/A	42 C	N/A
FAN HIGH	44 C	**38 C**	44 C
100% LOAD			
FAN LOW	N/A	65 C	N/A
FAN HIGH	66 C	**55 C**	63 C

Best scores are bolded. All temperatures were measured via the onboard sensors, using the utilities provided by the motherboard manufacturer. Idle temperatures were measured after 30 minutes of inactivity and full-load temps were achieved running CPU Burn-in for one hour.

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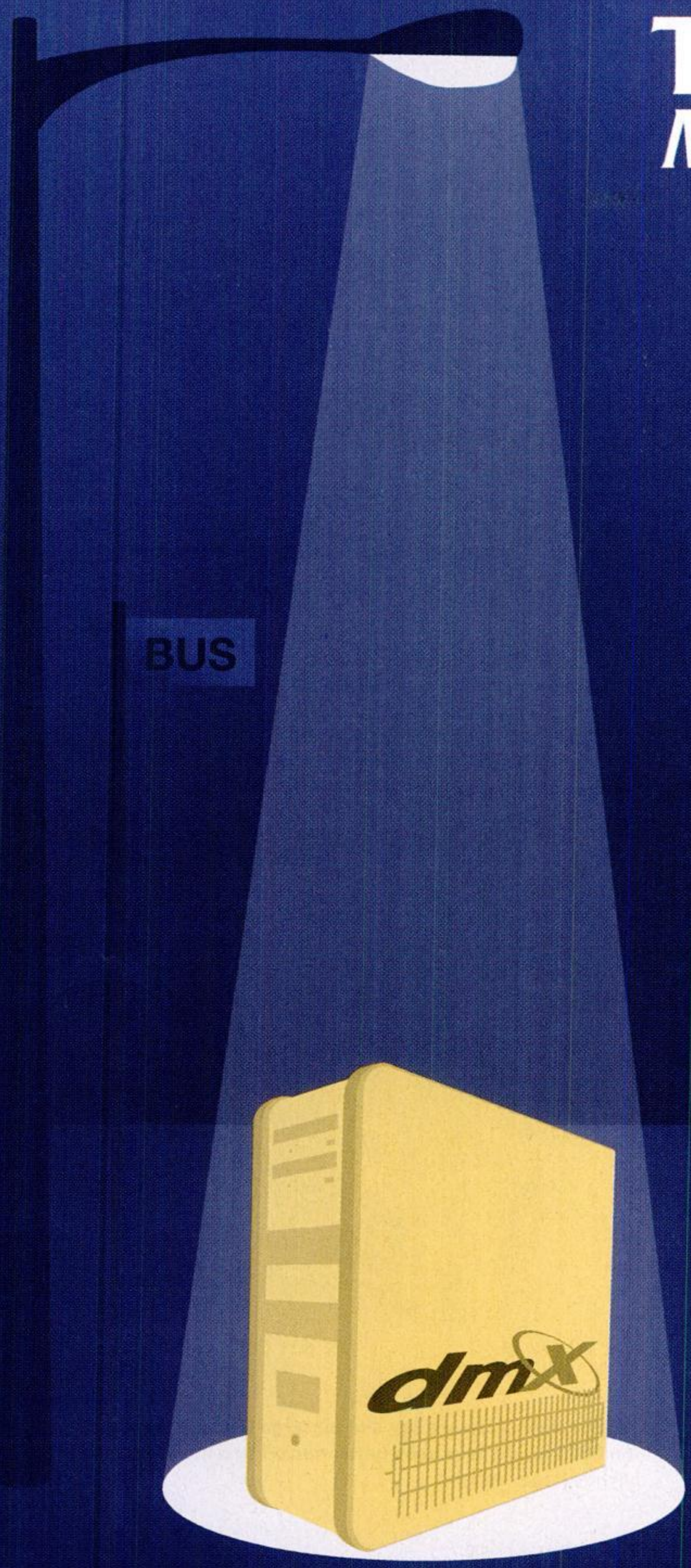

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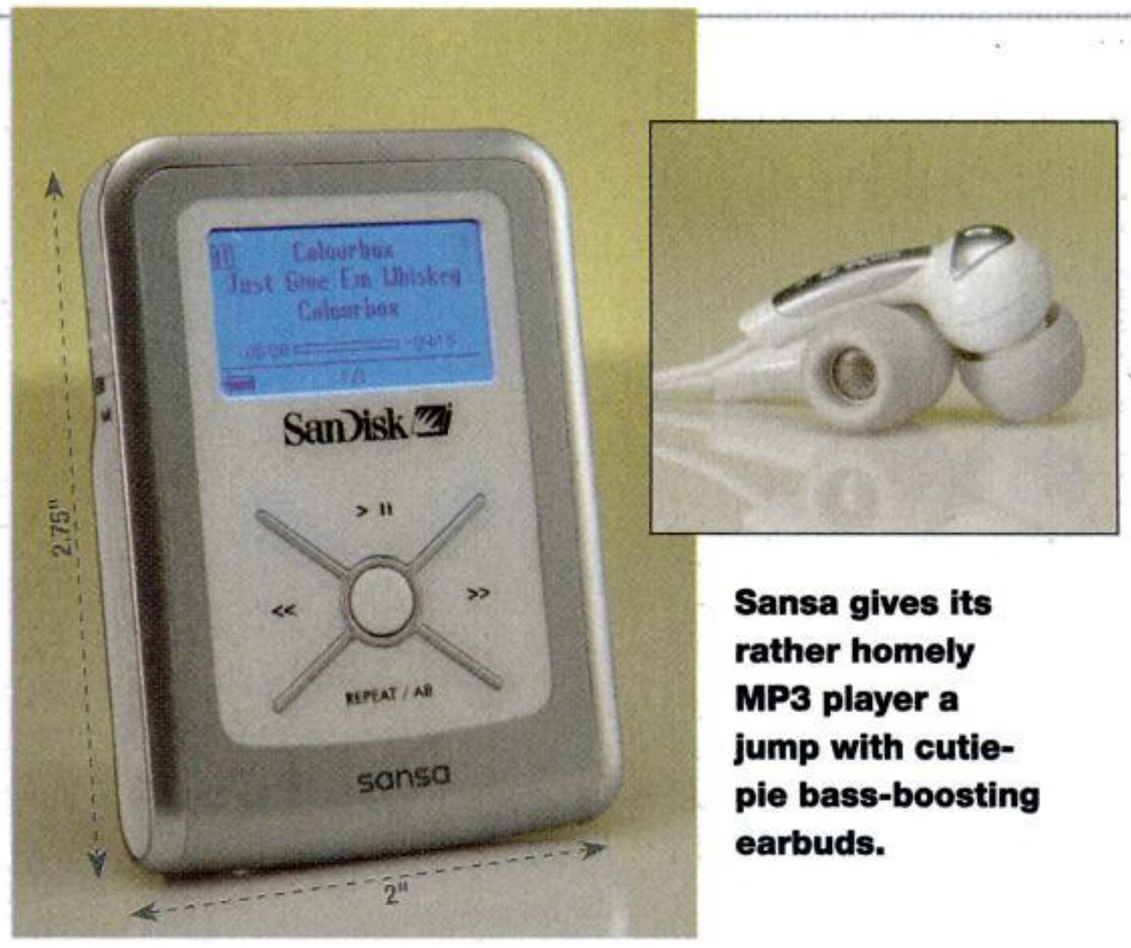
SanDisk Sansa 1GB MP3 Player

On the bright side, there's plenty of room for improvement



Sansa gives its rather homely MP3 player a jump with cutie-pie bass-boosting earbuds.

No matter how ugly somebody's kid is—even if he looks like a *goat*—etiquette prohibits discussion of the malady. No such rule exists for hardware reviewers, so let's get this out of the way: SanDisk's flash-based Sansa MP3 player crawled straight out of the ugly ditch. No one will stop you on the street to ask you about it, and *Newsweek* won't be putting it on the cover. Ah, it's just as well—the Sansa leaves much to be desired in an MP3 player.

Let's consider the controls first. How do you turn on the player? The play button? Nope. You have to hold down the menu button instead. Fine. How do you flip through tracks while a song is playing? You can't. The scroll wheel only controls volume during playback. Speaking of the scroll wheel, it's a victim of the same kind of poor industrial design that led to the Chernobyl disaster. It's so stiff that it requires considerable effort to move—so much effort that fine control with one hand is virtually impossible. You'll end up advancing the volume by four clicks instead of one, and even using a fingernail to scroll had us struggling to target the desired menu selection.

Audio reproduction falls below average, and well below that of premium players like the iPod or those from Creative Labs. Fortunately, there is a custom EQ facility, and the SRS WOW effects add welcome dimension. And SanDisk wisely includes a pair of earbuds with bass-boosting nubs that deliver a macho bass punch, which is great for running, working out at the gym, or indulging in other active-lifestyle customs.

We appreciate that you can augment the 1GB of built-in storage with additional memory via the SD card slot, but we can't recommend the Sansa unless your grandmother recently passed away and bequeathed to you several high-capacity SD cards. And even then, we'd still urge you to consider the good woman's sage advice: You better shop around.

—LOGAN DECKER

SANSA MP3 PLAYER **4**

$150, www.sandisk.com

Casio Exilim EX-P505

Lots of features crammed into too small a package

Too small for a camera bag and too large for your pocket, the P505 would have been better served by a more practical, slightly larger design.

A lot of sweat and R&D dollars were obviously spent making the Exilim P505 camera stylish and ultra-compact. Sadly, all this engineering- and marketing-muscle effort is lost on us. The P505 is a capable 5.1-megapixel camera, jam-packed with features, but Casio's focus on delivering the smallest possible formfactor has resulted in a camera that sacrifices practicality for looks.

What is the point of making the camera's body so small it's a challenge for users with even average "man hands" (let alone the big meaty variety) to navigate its buttons, if the 5x optical zoom lens is too big to let you slip the camera into your pocket? If, however, you plan on toting your camera around in a purse, backpack, or (horrors!) a "man purse," the P505 might be worth a look—particularly if you require above-average video performance.

The camera produces good-looking MPEG-4 video (640x480, 30fps, AVI format) that won't torture your eardrums—thanks to dual stereo microphones. The extra bulk from the lens actually makes the camera easy to balance and shoot with one hand. And the P505 sports a generous mix of newb- and enthusiast-friendly program modes, making the camera suitable for a wide range of skill levels.

The P505's still-image capabilities are just average outdoors (where the 2-inch LCD can be tough to use). Indoors, however, it ups its game. The powerful flash lights a fairly large room with ease and is excellent for portrait use. And the macro mode is also very good. In challenging low-light situations the camera does have some auto-focus issues, which would have been helped by a focus-assist lamp.

We'd be able to more easily forgive the P505's shortcomings—average still-image quality; lack of a focus-assist lamp, viewfinder, and continuous-shooting mode; and relatively high price—if it were truly an ultra-portable camera. It's not, so we'd rather have a slightly bulkier body, a bigger LCD, and (most of all) better pics, than the camera's compact "wow factor."

–STEVE KLETT

CASIO EXILIM EX-P505 **6**

$500, www.casio.com

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Mid-Tower Mash-Up

Two midrange gaming cases go belly to belly

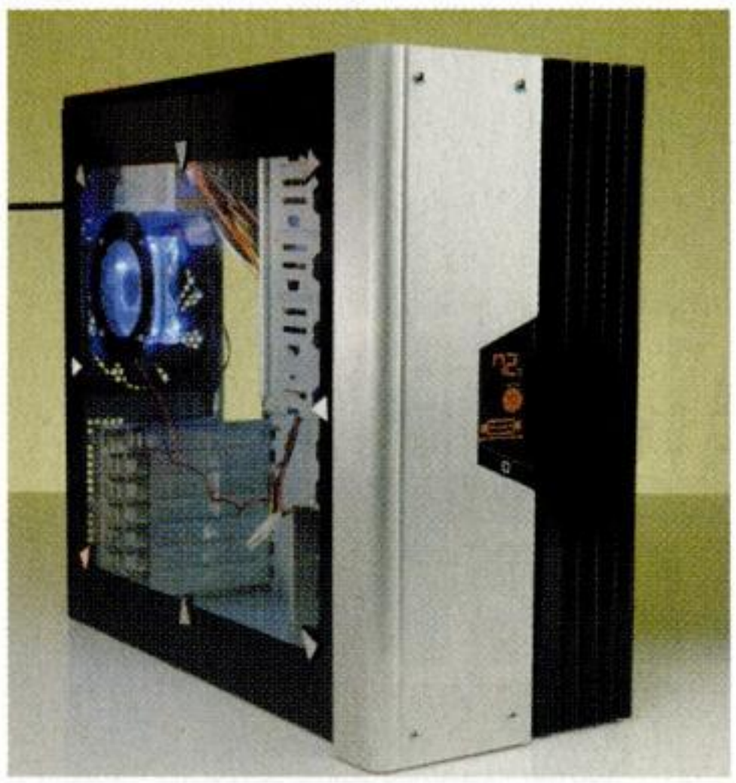
These days, if a case doesn't have GPS, anti-matter shielding, and a built-in back massager, it can seem downright boring. And if it happens to be top of the line, you're going to pay out the wazoo. Fortunately, these two mid-towers give you a taste of the good life at an affordable price.

—CLAUDE MCIVER

RAIDMAX X1

Raidmax has succeeded in making the X1 stand out from the average beige box. This all-steel specimen sports a high-quality paint job, and the front door boasts a large aluminum bezel that doubles as a handle. The bezel adds a touch of class, but, sadly, the lackluster plastic grooves that cover the other half of the door are a disappointment.

A red LED display on the door details hard drive activity and a temperature readout (in Fahrenheit only) of whatever component the internal probe is attached to. The display will also show whether a fan is connected, which is nice to know and all, but *duh*. What's even more gratuitous is that the display will say "power" when it, well, has power.



The X1's door-mounted 8cm fan ensures a fresh supply of O2 to the CPU.

The X1's precut side panel includes an acrylic window with triangular accents and an 8cm blue LED fan. Raidmax throws in a 450-watt power supply, which has both an intake fan and an exhaust fan. A 12cm exhaust fan completes the case's cooling system, providing good performance at low decibels. There's also a 12cm fan mount in the front of the case, but a fan isn't included.

Removable motherboard trays are a godsend, so we're happy to find one here. The X1 is stocked with five 5.25-inch and two 3.5-inch external bays, as well as three 3.5-inch hard drive bays. "Tool-less" means different things for different cases, and on the X1 it means nifty drive latches on the drive bays. Each latch contains a pin that inserts into one of the drive's screw holes. So installing your new Raptor or even a floppy drive is a cinch. We ran into a bit of trouble lining up the pin with the hole, but once you get it in there, the drive is totally secure. The fasteners, which slide into place to secure PCI cards, are equally useful. The X1 gets extra credit for rotating the hard drive cage 90 degrees, which makes drive swapping easy and allows you to route unsightly cables behind it.

As far as budget boxes go, the X1 is impressive. While it didn't make us swoon, it certainly didn't make us curse either.

THERMALROCK ECLIPSE

Thermalrock's slogan is "Innovation Everywhere," but there's not a whole lot of that in the company's first case, dubbed the Eclipse.

One example of this so-called "innovation" is the external CD storage compartment. Every Eclipse case includes a blank CD-R that's either red or purple (depending on the case color), which can be inserted into a holder on the front bezel. So you have a red or purple circle on the front of your case! Now that's innovation in the sense that we've never seen it before, but there's a reason for that—it's useless. Similarly, a blue LED lights up the front door, which looks cool but offers no tangible benefits.

Yes, that's a red CD-R in the Eclipse's front bezel. Sadly, it's just a holder and not a CD player.

What is actually cool, though, is the bevy of useful features inside the case. A front door, which sports a stylish split-panel aesthetic, opens to reveal the case's bezel, which itself opens up to give you access to the drive bays and case frame. Inside, are a removable five-drive hard drive cage, a removable two-drive 3.5-inch bay, and four 5.25-inch bays. The interior is entirely tool-less, using thumbscrews for hard drives and easy-to-install plastic rails for optical drives. PCI cards are secured via plastic clips that snap into place quickly and easily. Cooling is handled by two 12cm fans—one intake (which also cools hard drives) and one exhaust.

In addition to its lockable front-door panel, the lightweight, all-aluminum case's side-panel can also be locked—in the event the national terror alert reaches orange or above. And if someone does manage to get the side panel off, it comes rigged with an alarm. PC terrorists beware!

While the Eclipse has some decent features, it's really no more than an average case—it's not offensive in any way, but there are certainly better options.

RAIDMAX X1

+ STAND OUT
Easy tool-less design, and an included power supply.

− HIDE OUT
Only two SATA power adapters.

8

$75, www.raidmax.com

THERMALROCK ECLIPSE

+ INNOVATION
Side- and front-panel locks, and a security alarm.

− CONSTERNATION
No mobo tray, no PSU, and a silly CD storage system.

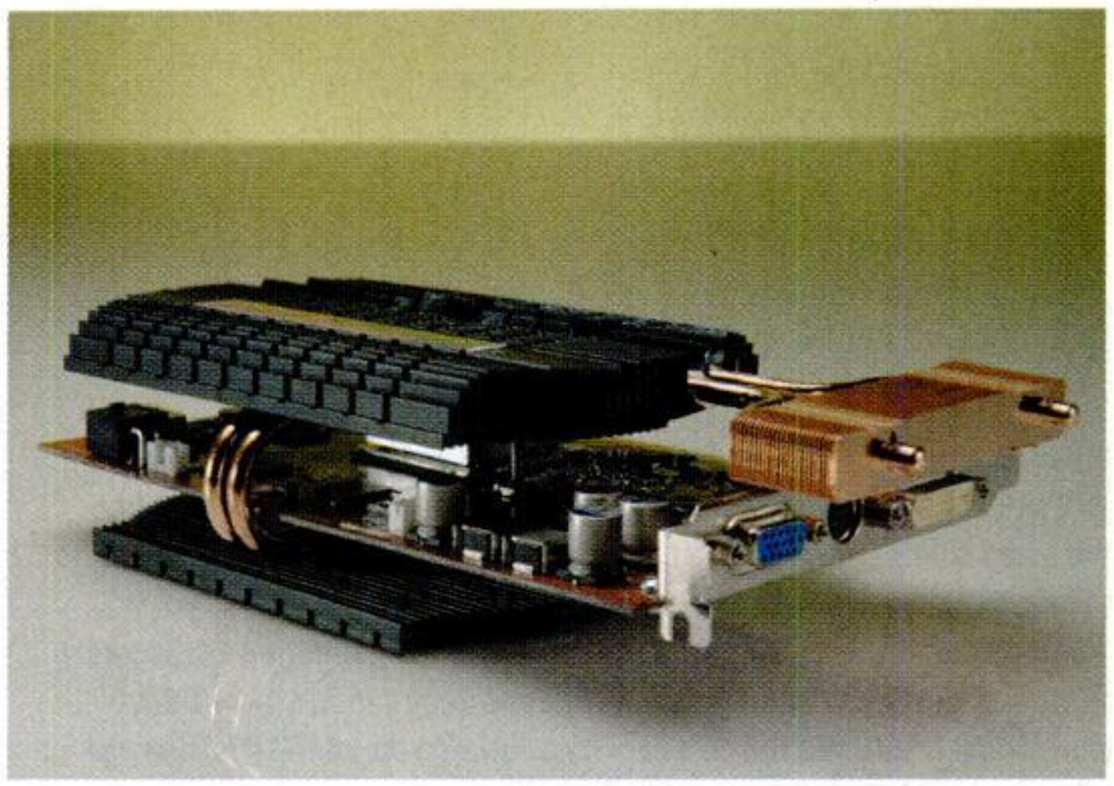
7

$130, www.thermalrock.com

Copyrighted material

Thermaltake Schooner CL-G0009

A great space heater for the winter months



While the Schooner provides videocard cooling sans fans, using it is akin to running a furnace inside your PC case!

Thermaltake's Schooner is a fanless VGA cooler that sends heat from your videocard's GPU into two huge heatsinks via heat pipes. The heat is then sent to the outside of the case by way of another pair of heat pipes that are attached to a small array of fins, which poke out the back of your PC. It's a clever concept, and it works, though we'd never use it on our own videocards, and neither should you.

The reason is simple: Without fans blowing over the Schooner's heatsinks, they become the source of a tremendous amount of heat build-up—warming both the videocard and the case to almost nuclear levels. As the benchmark numbers show, our X800 XT test card was so hot under load we needed oven mitts to remove it from the case after testing. Our test videocard's temps ranged from 75 C to around 85 C, or 185 F! (For the sake of comparison, consider that Intel CPUs usually throttle down at about 74 C in an attempt to save the CPU from an impending meltdown.) Running a videocard at such temperatures for prolonged periods of time is like running your car at near-redline for a few hours, and will certainly shorten the lifespan of the card.

What's more, the Schooner is time-consuming to install. Though the installation was relatively straightforward, it took approximately an hour and a half and was grueling given the complexity of the apparatus. We also had trouble fitting the Schooner in several PCs in the Lab, as it either touched the north bridge cooler or the external fins were too tall to fit through an empty PCI slot cover.

Obviously, we're not impressed. Although it's possible the Schooner could work just fine with four- and eight-pipe cards, users with beefed-up GPUs should stay far, far away from this product!

—JOSH NOREM

BENCHMARKS

	STOCK COOLER	SCHOONER
IDLE	**40 C**	45 C
100% LOAD	**71 C**	84 C

Best scores are bolded. The Schooner was tested on an ATI Radeon X800 XT. Idle temps were measured after 30 minutes of inactivity. Full load was achieved by looping 3DMark05 for one hour. Temps were measured using the card's onboard sensor.

SCHOONER CL-G0009 **3**

$40, www.thermaltake.com

demonic possession

de•mon•ic (dĭ-mŏn′ĭk)
adj. pos•ses•sion (pə-zĕsh′ən)

1. BEING COMPLETELY CONTROLLED BY *passion* OR THE SUPERNATURAL
2. A *mania* RESTRICTED TO ONE THING OR IDEA AT THE EXCLUSION OF ALL ELSE
3. MOTIVATED BY A *spiritual* FORCE OR GENIUS; INSPIRED
4. THE STATE OF A HUMAN BODY UNDER DEMONIC *influence*, WITH THE INTENTION OF USING IT FOR *punishment* OR A TEST.
5. YOUR NEW *Voodoo Omen Extreme Gaming Machine*. THE PRECIOUS, THE ONE AND ONLY.

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hard drive by HITACHI · AMD 64 Athlon · Ultimate Game Machine Gaming · Voodoo www.voodoopc.com

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Turtle Beach Ear Force HPA

These phones fall far short of their surround-sound promise

Turtle Beach's Ear Force HPA headphones are OK, but if you really want surround sound, look elsewhere.

We know good surround-sound headphones exist. We pitted models from Pioneer and Sony against each other in our May 2005 Head2Head and came away impressed with both contenders (Sony won the match by a nose). We're much less taken with Turtle Beach's effort.

Of course, we're talking about two completely different price categories: Pioneer's model SE-DIR800C sells for $400 and Sony's model MDR-DS8000 fetches twice that. Turtle Beach's Ear Force HPAs go for just $100. Then again, the Pioneer and Sony products do a lot more—they're both wireless and they both have surround-sound decoder modules, for example. Turtle Beach relies on your PC's soundcard for signal processing, and these headphones keep you tethered to your source device.

Yeah, yeah, we know. Whadaya want for a hundred bucks? Well, we want headphones that sound good with games, movies, and music; that are comfortable to wear for long periods at a time; and that are rugged enough that we don't have to worry about throwing them in a bag when we head off to a LAN party. The HPAs score well in only that last category, thanks to hefty materials and solid construction.

Unlike conventional headphones, the HPAs have three separate jacks to match a 5.1-channel soundcard. A separate adapter enables you to plug in speakers at the same time. To test the headphones, we plugged them into a Sound Blaster Audigy 2 soundcard and played games, movies, and DVD-Audio. The phones did a commendable job producing booming bass and tight midrange—critical to all three applications—but they had difficulty producing inspiring highs. Compared with both mid-priced loudspeakers and stereo headphones, high frequencies on the HPAs sounded muted and flat.

And when it comes to producing surround sound, the HPAs fall flat on their face. No matter how much we tweaked the inline amplifier's separate volume controls for front, center, surround, and subwoofer channels, the HPAs never pulled off the trick of throwing audio events behind our heads. And if a surround-sound system can't accomplish that, it just doesn't deserve the designation.

—MICHAEL BROWN

TURTLE BEACH EAR FORCE **5**

$100, www.turtlebeach.com

Toshiba Bluetooth Headphones

These cans deliver quality wireless audio

Toshiba's wireless headphones use Bluetooth technology to cut the headphone cord.

Wireless audio frequently entails sacrificing fidelity in the name of convenience. Toshiba seems to have licked the noise problem with its Bluetooth headphones, but not without making a few other minor tradeoffs.

Audio quality is the most important consideration when we evaluate headphones, and we were surprised at how good—and how quiet—these Toshibas sound; we detected zero background noise. Demonstrating excellent dynamic range playing audio CDs on a PC, they produced throbbing bass in Robert Earl Keen's "The Great Hank" and still managed to turn out sparkling mandolins in Paul Thorn's "Where Was I?" Game soundtracks sounded equally good. The phones didn't get uncomfortably loud, but at max volume, they drowned out pretty much all outside noise.

The Li-Ion battery delivered a little more than six hours of continuous use on a full charge, and the headphones remained comfortable during extended listening sessions. A sturdy yet flexible plastic band wraps around the back of your head, and the foam-covered earpieces rest snugly on top of your ears without being too tight. Volume- and track-control buttons are integrated into the left earpiece. Detents on the volume buttons make them very easy to locate; the track-control buttons (which function only with *Windows Media Player* and *WinDVD*) are only a little more difficult to manipulate. A large button in the center of the earpiece toggles between pause and play.

You might recognize these headphones as Logitech's wireless iPod phones, but Toshiba tells us its own engineers are responsible for optimizing the Bluetooth audio delivery. The company claims you can wander up to 16 feet away from the source, but the signal broke up if we moved about vigorously at any distance. We also experienced infrequent dropouts while seated, but these weren't common enough to bother us.

You'll need to purchase an adapter if your playback device isn't already outfitted with Bluetooth 1.2. Toshiba's PC USB adapter costs $45, but we've seen other models selling for half that. We advise anyone looking for a wireless personal audio fix to check out Toshiba's offering.

—MICHAEL BROWN

TOSHIBA HEADPHONES **8**

$90, www.toshiba.com

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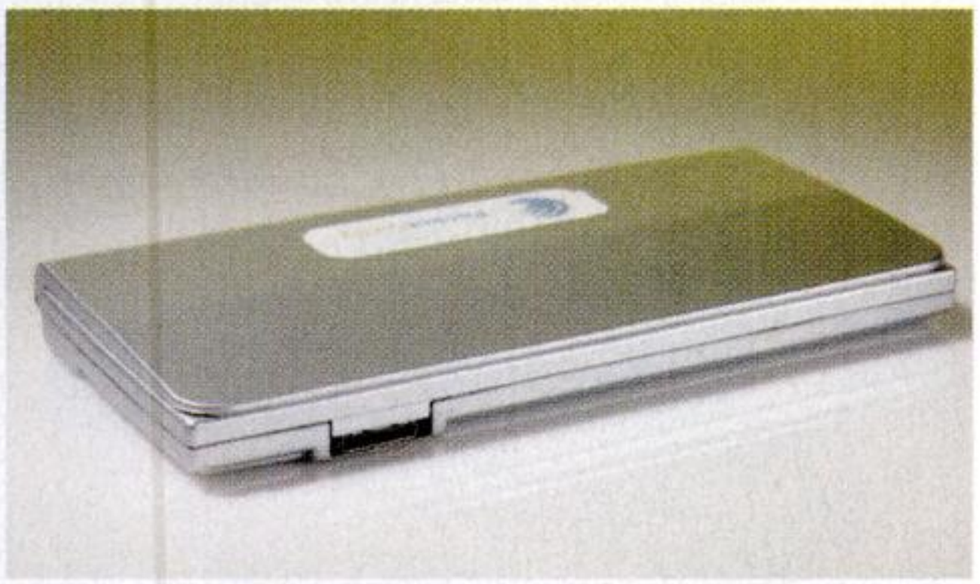
DataWind PocketSurfer

A clunky but effective way to take the web with you

The PocketSurfer piggybacks on your cellphone's wireless data plan, for web surfing, but it's an expensive and kludgy alternative to a smartphone.

Have you ever seen a flying squirrel take to the air? They don't really fly, they just glide for a few yards and then crash into the nearest tree. The landings are pathetic, but that's evolution for you: It's always coming up with custom-fit and often loopy solutions for every imaginable need. DataWind's PocketSurfer is another such example. *If* you want to surf the web on the road, but your phone *doesn't* have a web browser, but you *do* have a data plan, and you *don't* want to take a laptop with you, then the PocketSurfer is *perfect* for you!

Otherwise, it's hard to say why you'd choose the PocketSurfer over a smartphone. Yes, it's got a much bigger screen, at 5.25-inches on the diagonal, but on the other hand, the device is 6x3-inches when folded, making it too bulky for even most jacket pockets. The exterior is silver plastic, complete with the same tacky injection-molding seam you find on squirt guns, and it scratches easily; by the end of our review period, the test unit looked like a battered checkbook. The PocketSurfer wasn't designed to be used on a flat surface, as the top-heavy screen portion of the device will simply fall backwards on its loose hinge. So you've got to hold it with both hands and use your thumbs for typing and navigation, which gets uncomfortable after 10 or 15 minutes.



Six inches long and almost half an inch thick, the PocketSurfer might wear you down faster than a PDA.

The PocketSurfer doesn't have its own wireless data service; instead, it connects to your Bluetooth-enabled phone and uses it as a modem, riding along on your wireless carrier's data plan. If your phone doesn't have Bluetooth, you can purchase a Bluetooth adapter for your phone from DataWind for $30 (we were even able to outfit a three year-old LG TM510). At this point, however, you might become annoyed at the expense. Not only do you have to pony up for the PocketSurfer, a wireless data plan, and a Bluetooth adapter if your phone doesn't have Bluetooth built-in, but also an additional $10 a month for DataWind, as all web pages are funneled through DataWind's proxy servers for compression. *Argh!*

Initializing the device, connecting to the Bluetooth adapter, and completing the registration process were quick and painless processes. And once we connected our phone, the device stayed connected reliably up to four feet away. Although the screen's resolution is 640x240, you lose some of the valuable real estate to a status indicator bar at the top.

Navigation is controlled using the four-way rocker switch; clicking links, however, requires you to take your thumb off the rocker switch and press yet another button. Regardless of our data rate, pressing this button always resulted in a two-second delay before anything happened—at least you get an hourglass icon to indicate you did press the button. The custom compression provided by DataWind's servers and the option to reduce the display quality of images can make loading pages quite fast, but you still have to deal with the keypad delays. The screen looks dim even at high-brightness settings, and the battery lasted less than four hours on a full charge.

Smartphones and PDAs may have a limited screen area, but these devices offer plenty in return for the sacrifice (such as portability and a plethora of third-party software). The PocketSurfer reverses this deal, giving you a single strong advantage—a plenty-wide screen—while sacrificing just about everything else. But if you don't mind a clumsy solution that's as silly as wings on a squirrel, it does get the job done.

—LOGAN DECKER

DATAWIND POCKETSURFER

SURFERS

A much wider screen than smartphones and PDAs sport.

GRIEFERS

Expensive, bulky, and awkward to use.

4

$200, www.datawind.com

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Metadot Das Keyboard

Introducing the official keyboard of Spinal Tap

Look Ma, no labels! The keys on this seemingly blank slate, hold untold secrets.

The question is, how much more black could it be? The answer, in the words of the inimitable Nigel Tufuel, is, "none." With no extraneous adornment—such as labels for the keys—the Das Keyboard is really, seriously black. This is a keyboard that leaves hunt-and-peckers crying for mercy.

When you put a plank like this on your desk, you're sending a message. You're saying, "I'm a badass typist, and I know it." The truly beautiful thing is that the Das Keyboard also says, "I'm a discriminating typist." Even without the no-label gimmick, this is a keyboard worth cherishing—we wouldn't attach just any keyboard to our Dream Machine, after all.

The Das Keyboard's secret is in its individually weighted keys. While all the keys on standard keyboards require the same amount of force to depress, the Das Keyboard has five different groups of keys, each of which responds to a different degree of force to accommodate the way most people use a keyboard. For example, the space bar, where you might naturally rest your thumbs, requires substantially more pressure than normal, so as to avoid inadvertent depression; while keys you press with your pinkies and ring fingers (also known as the wussy fingers) require much less than the normal amount of pressure, so as not to strain those delicate digits. Though seemingly minor, the differences in pressure make typing on the Das Keyboard a sublime experience.

The key action is extremely satisfying, with just enough of a click to let you know you pushed down the key, but not so much noise it'll keep your spouse awake in the next room. We'd love it if the Das Keyboard included an integrated USB hub and came in an ergonomic split option, but we've got to hand it to the folks at Metadot, nonetheless. The company took a standard Keytronics keyboard shell and built a board whose praises we'll be singing for years.

—WILL SMITH

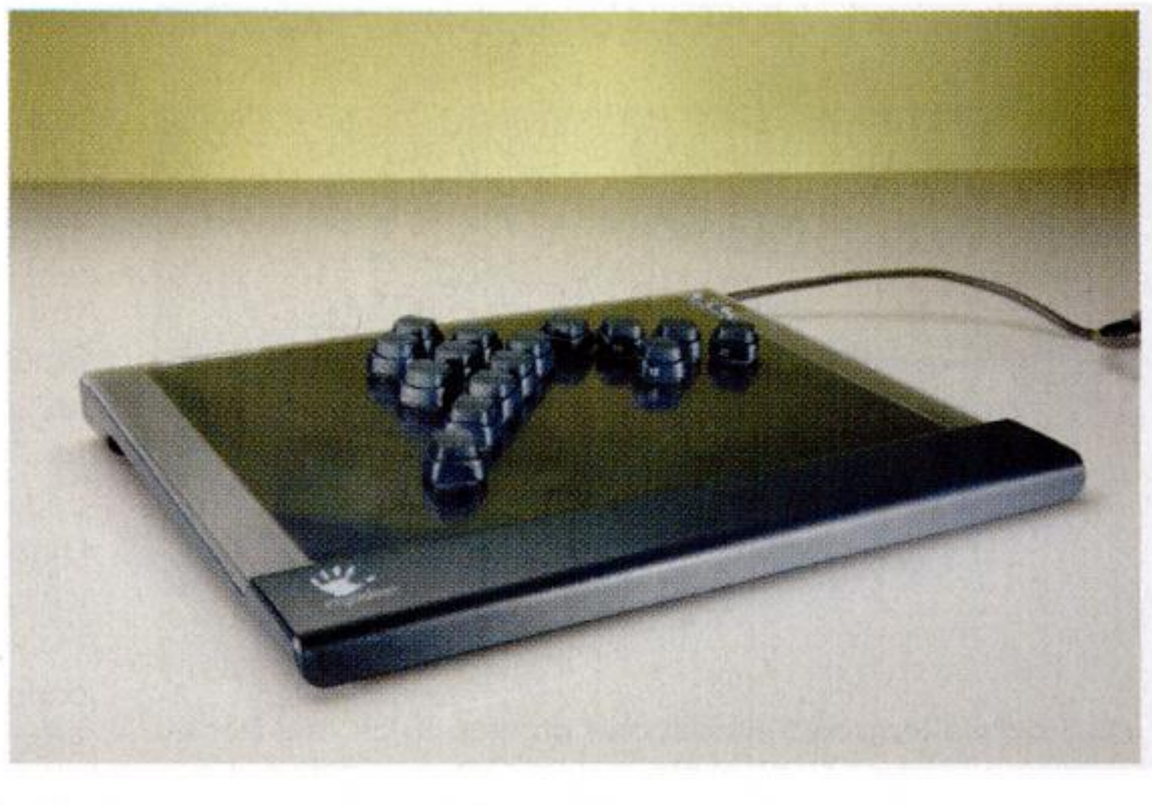
METADOT DAS KEYBOARD 9

$80, www.daskeyboard.com

MAXIMUM PC KICKASS

Erogdex DX1

With proper tweaking, this customizable keyboard kicks ass



The Ergodex DX1 is a totally configurable keyboard. Move the keys to suit your play style, then program them to do anything you want!

The keyboard and mouse make a fine game controller, but the experience could definitely be better. The keys, while grouped in a way that makes sense for typing, don't always make sense for gaming. The DX1 lets you custom-place up to 50 keys on a special surface, then bind those keys to damn near any in-game function.

Here's how it works: Each DX1 comes with a pad, a tray, and 25 keys. You mount the tray on the pad, then stick the keys on the tray in whatever configuration you'd like. Each key has a reusable sticky gel-pad on the bottom, so if you're unhappy with a key's placement, you can simply twist it off, and re-stick it in a better spot. We tried several different placement options with a variety of games.

Once you've positioned the keys to your liking, you can either open the key-management software that comes with the DX1 or simply fire up the game you want to run, and then start programming macros while you're playing your game. Making a new macro, complete with properly programmed timings, is as simple as pressing the macro button on the pad, keying in your macro, pressing the key you want to assign the macro to, then pressing the macro button again. It took us about 15 minutes to program macros for all 25 keys that ship with the card.

The ability to create macros is the truly beautiful thing about the DX1. We used *World of Warcraft* to test the board, but it will function similarly for damn near any game genre. After a few minutes of mucking around, we had macros that attacked a monster, cast our three attack spells (and left the appropriate length of time between actions), and then sent our pet in to finish the monster off, all automatically. This type of manual assistance could be considered cheating, or at least unsavory, but we don't have a problem with it when it's used to minimize unnecessary repetitive hand movements. We wish there was a way to stop a macro once it started, but that's a small price to pay for this much gaming convenience.

—WILL SMITH

ERGODEX DX1 8

$150, www.ergodex.com

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Juiced

A street-racing game made from concentrate

Juiced is the latest underground racing sim to hit store shelves, and it reeks more of commercial exploitation than legitimate street cred.

From the get-go, *Juiced* wastes no time putting you into a drivers seat to live out your dreams of asphalt domination. There's no infiltration of an underground scene; the career mode begins as soon as the game starts. Next thing you know, you're racing to win in a borrowed car, and from there every taste of victory allows you to buy newer, faster cars, or to trick out the one you're currently racing.

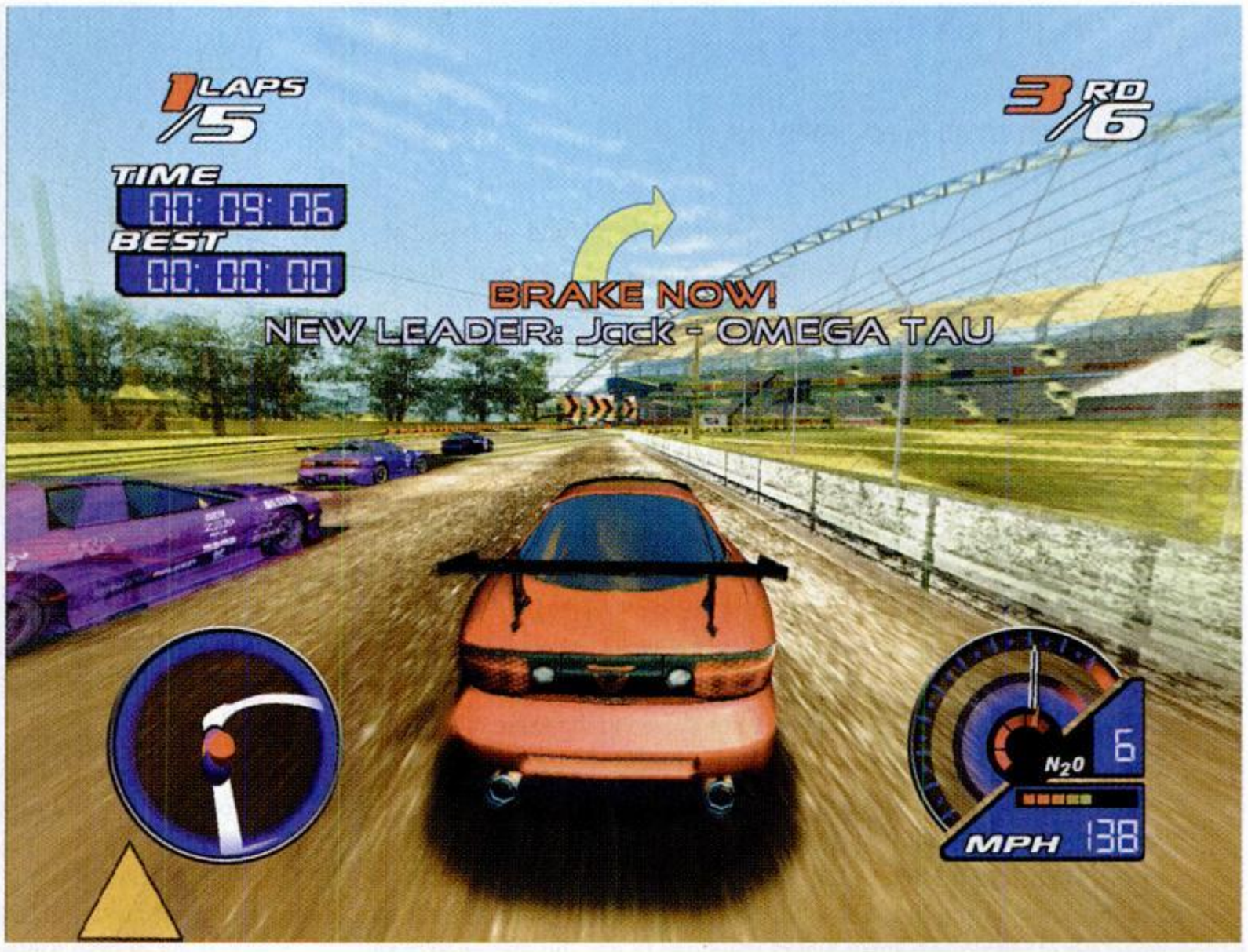
A calendar of racing events is available for you to pick and choose from. Some events are free and can be used to build your bank account as well as "respect," which is gained by winning races, performing stunts, and satisfying other requirements. Some racing events require you to pay an entry fee or to have a certain level of respect in order to participate, which is aggravating but gives you something to strive for in the game's early stages. You can also earn money betting on races from the sidelines, but unfortunately you have to actually watch the entire race unfold, which gets boring fast.

As in real life, customizing your cars becomes a major time suck requiring serious investment, but it's incredibly satisfying to turn a used hunk of junk into an awesome beast of a machine. (*Juiced* shamelessly flaunts its licensed brands, and you're reminded at every turn that the NoS-powered Acura you're driving is actually approved by Honda.) While racing for "pinks" in all-or-nothing races is uncomfortably tense and thrilling, we always chickened out if we were losing and would just opt to not save the game.

Handling is more arcade-inspired than simulation-based, and the damage modeling is disappointing. Though cars take a beating in races and you're forced to pay for repairs afterward, you never get the sense that your car is actually smashed up or in need of repair. We were also turned off by the closed-circuit nature of the tracks. If this is illegal street racing, we'd like to be dodging pedestrians and avoiding cops, not bumping into roadblocks.

The arcade mode is the most enjoyable part of the game, and makes competing in the campaign to unlock cars and tracks worthwhile. You'll be satisfied if you treat *Juiced* as an arcade racer, but those itching for a realistic underground racing sim should look elsewhere.

—NORMAN CHAN



"I can see through time!" You'll find no shortage of motion-blur and other mind-bending effects in *Juiced*.

JUICED

FRESH SQUEEZED
Licensed cars and parts, fun arcade mode, and sparkly graphics.

CONCENTRATE
Weak damage models, frustrating career mode, and simple tracks.

7

$40, www.juiced-racing.com, ESRB: T

GAMEGEAR

BUTTKICKER GAMER

You know those hooptie-mobiles that pump so much bass your fillings rattle? That's the idea behind the ButtKicker Gamer. The difference is that this subwoofer sans speaker vibrates your chair. Think force feedback—for your *ass*.

Connect your PC's bass output to this 100-watt amp, and it will drive a piston clamped to your chair. The piston's rapid movement produces intense vibrations synchronized to low-frequency audio events, a sensation that's about as much fun as a sonic enema.—MB

BUTTKICKER GAMER **2**

$150, www.thebuttkicker.com

XFX XGEAR DUAL REFLEX

The XGear is a standard dual-thumbstick USB controller, with an eight-way directional pad, and eight buttons. And it's built big—to accommodate adult-size mits. During testing, we found the pad comfortable to use, and the no-slip rubber grip is a nice touch. Programmable macro functions, vibration feedback, and some gratuitous (but cool) green lights, round out the package.—SK

XFX XGEAR DUAL REFLEX **8**

$40, www.xfxforce.com

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Area 51

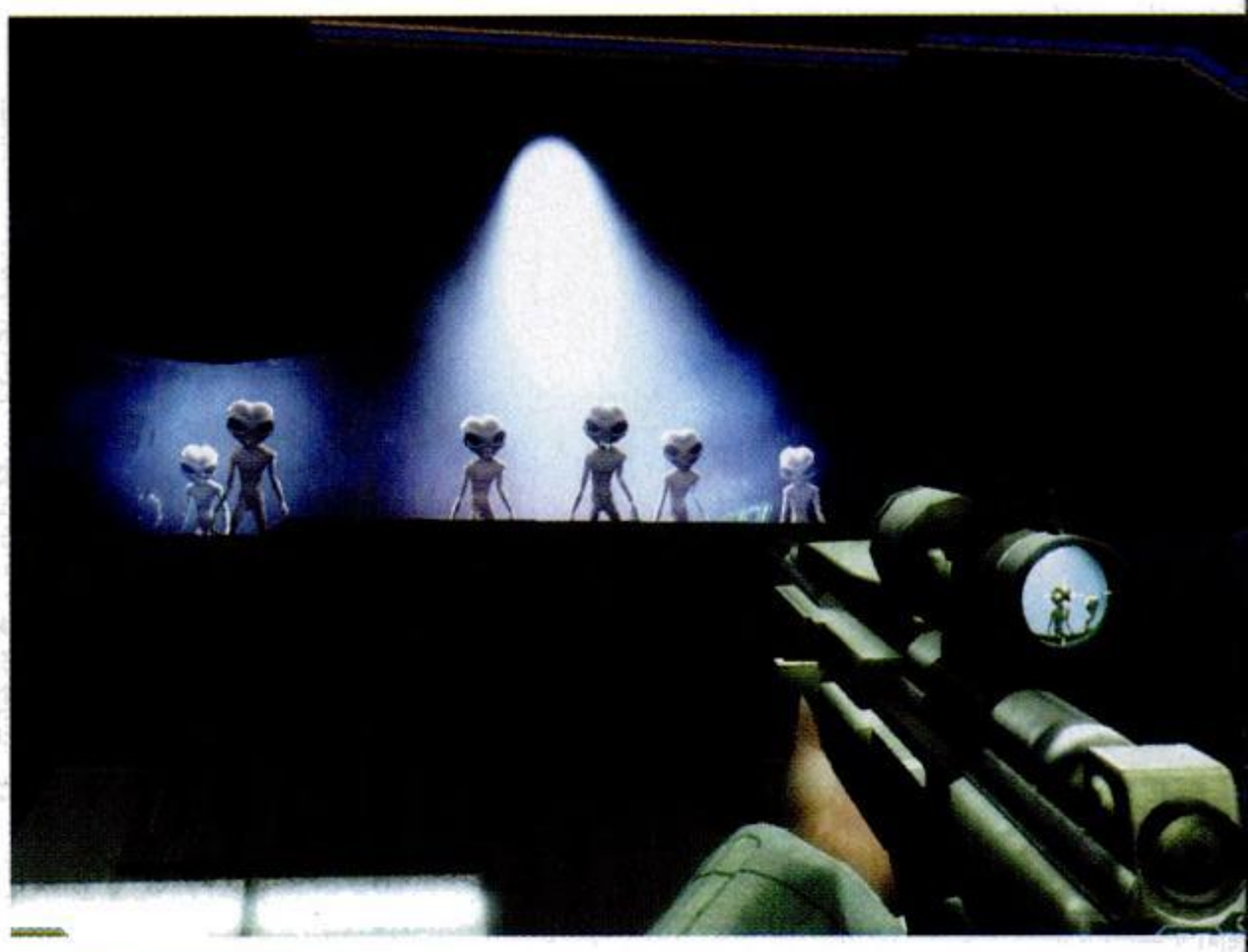
As much fun as an Alien probe

We began to suspect that *Area 51* might not be the end-all, be-all of shooters when we saw that the ad campaign for the game closed with, "Coming soon to a bargain bin near you." OK, we made that up, but it's gonna happen—you just know it.

Unlike the fun light-gun version of the game in arcades and pizza parlors everywhere, the PC version of *Area 51* is a spectacularly bland first-person shooter with a cliché-ridden storyline that goes like this: There's this top-secret base, a disturbance takes place, and you and your hazmat team are sent in to find out what happened. You get there and—oh my god—aliens begin killing everyone. Run away. Oh no.

That's when the shooting starts. And this ain't no *Doom 3,* one-monster-at-a-time snoozefest; it's wave after wave after wave of baddies, *Serious Sam* style. Normally, mass slaughter makes us happy, but in *Area 51* it's just repetitive and formulaic. The same enemies spawn in the same locations and come after you in the same way, over and over and over, for 10 or 15 minutes at a time. We would've killed for a little variety in the monsters or how they attack, but alas there was none.

The missions are totally linear. You have to go to point A to pick up an item, which you then carry to point B, and so forth. The game does a good job of letting you know where you need to go—an onscreen arrow points you in the right direction—but the "find the key" gameplay is as boring as ever.



As far as generic shooters go, *Area 51* isn't bad. As far as great shooters go, it's not even in the ballpark.

If nonstop action and violence are your thing, you may get a kick out of *Area 51.* Anyone looking for originality, innovation, or even a little fun, however, will be totally disappointed.

—JOSH NOREM

AREA 51 — **5**

$30, www.area51-game.com, ESRB: M

RollerCoaster Tycoon 3: Soaked!

So good you'll wet yourself

Last year's *RollerCoaster Tycoon 3* arrived as an enjoyable addition to the franchise, but it was incredibly buggy at launch. Half a year (and a good patching) later, the roller coaster-building/theme-park management sim is a smooth ride that practically demands an equally slick expansion pack. And, boy, did it get one.

***RCT3: Soaked!* compliments the original game by adding everything and anything you could possibly find at your local water park and then some. Aquaman couldn't think of more uses for the wet stuff—you can build splashy pools complete with whirlpools, lifeguards, springboards, and wave machines; create refreshing new rides like lazy rivers for rafting, and winding paddleboat and windsurfing courses; and you can even litter your park with water jets so visitors (aka "peeps") can soak each other silly.**

***Soaked!* has a new nine-mission career mode, but all of the expansion's features—including its two new themes (Atlantis and Paradise Island) and more than 50 new rides—are available in *RCT3's* free-form play mode. The expansion improves on the original's park-building utility by allowing you to tunnel through hills and underwater so roller coasters and flume rides can pass through, and it also incorporates a very easy-to-use waterfall designer to enhance your park's peep-pleasing ability.**

One of the coolest features in the original *RCT3* is the fireworks Mixmaster utility for conducting elaborate nighttime displays. *Soaked!* makes an even bigger splash by adding laser light shows and water fountains to the "Mix," and allowing you to synch the choreography with your own music tracks.

And just because it's got water, don't assume that *Soaked!* has traded all of *RCT3's* coasters for killer whales. You get several new coasters, most notably a water-powered roller coaster called The Roller Soaker, and 16 new car types. In addition, existing coasters can be customized with water splashes and jet streams.

***Soaked!* lets you create everything from exotic water rides to simple splash pools for wee tots (aka pee pools).**

The expansion's downsides are those that afflict the game in general. Path-making, in particular, can be a headache, especially when dealing with ground of varying elevations, and frame rates suffer when parks get too large. That said, *Soaked!* is as wet and wild as the rides themselves!

–CHUCK OSBORN

SOAKED! — **9**

$30, www.atari.com, ESRB: E

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SINTEK INDUSTRIES

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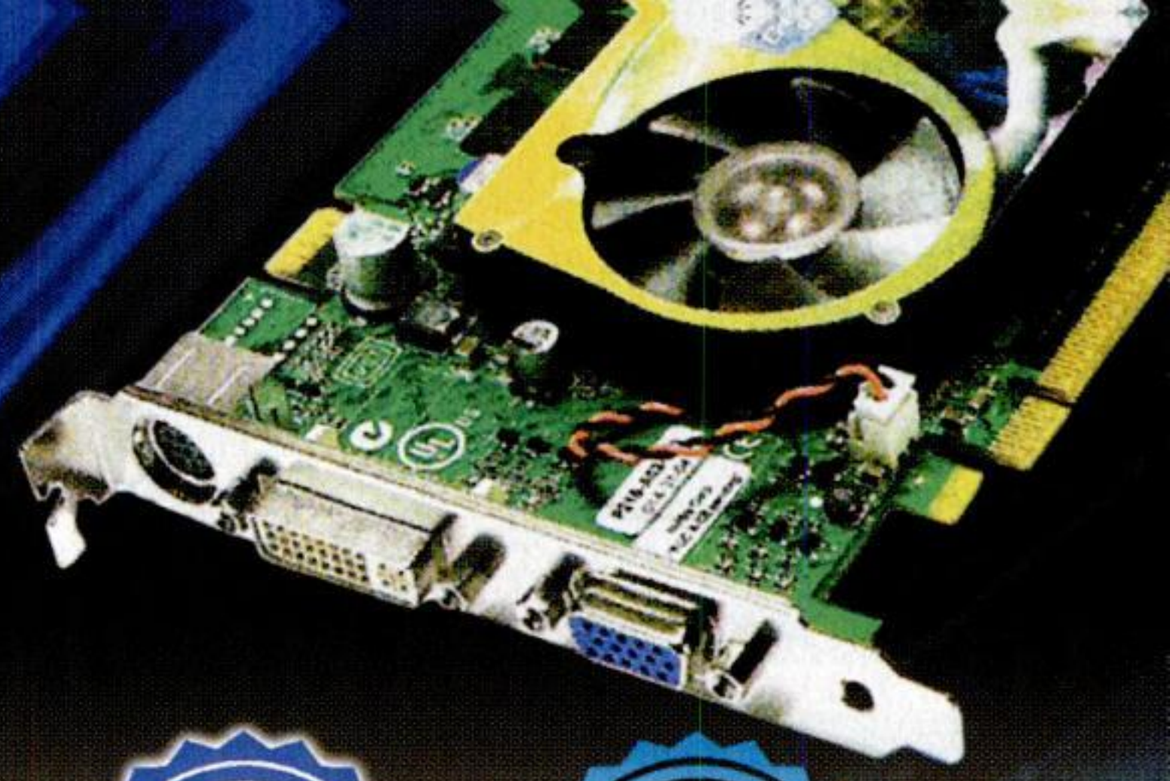

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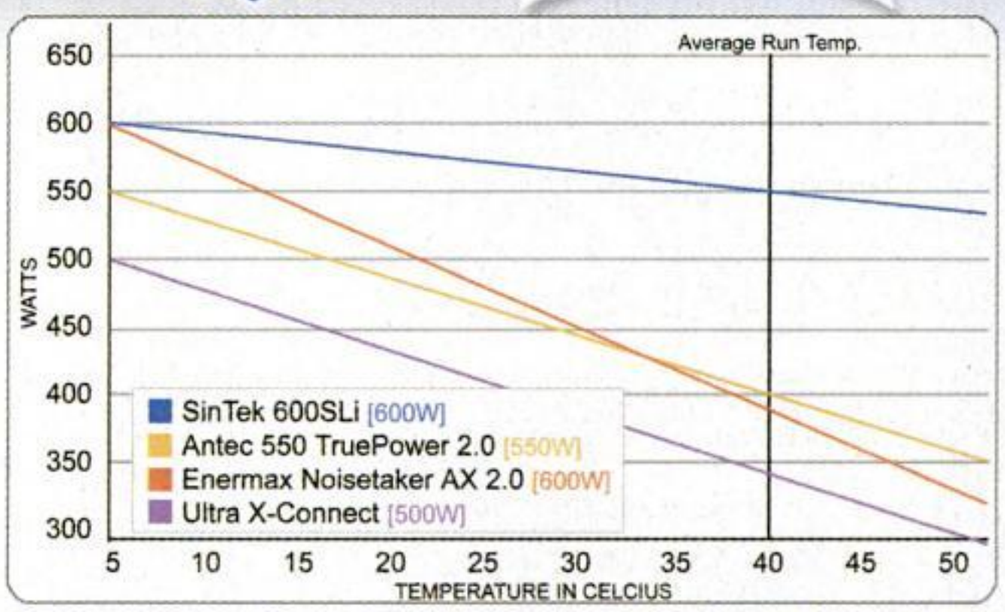

As computer performance increases, temperature increases as well, dropping significant wattage, increasing the chance of computer failure, low performance, and/or damage. SinTek power supplies maintains its wattage output with its Patented Technology.
(Information gathered from PC Enthusiast Magazine June/July 2005 Issue)

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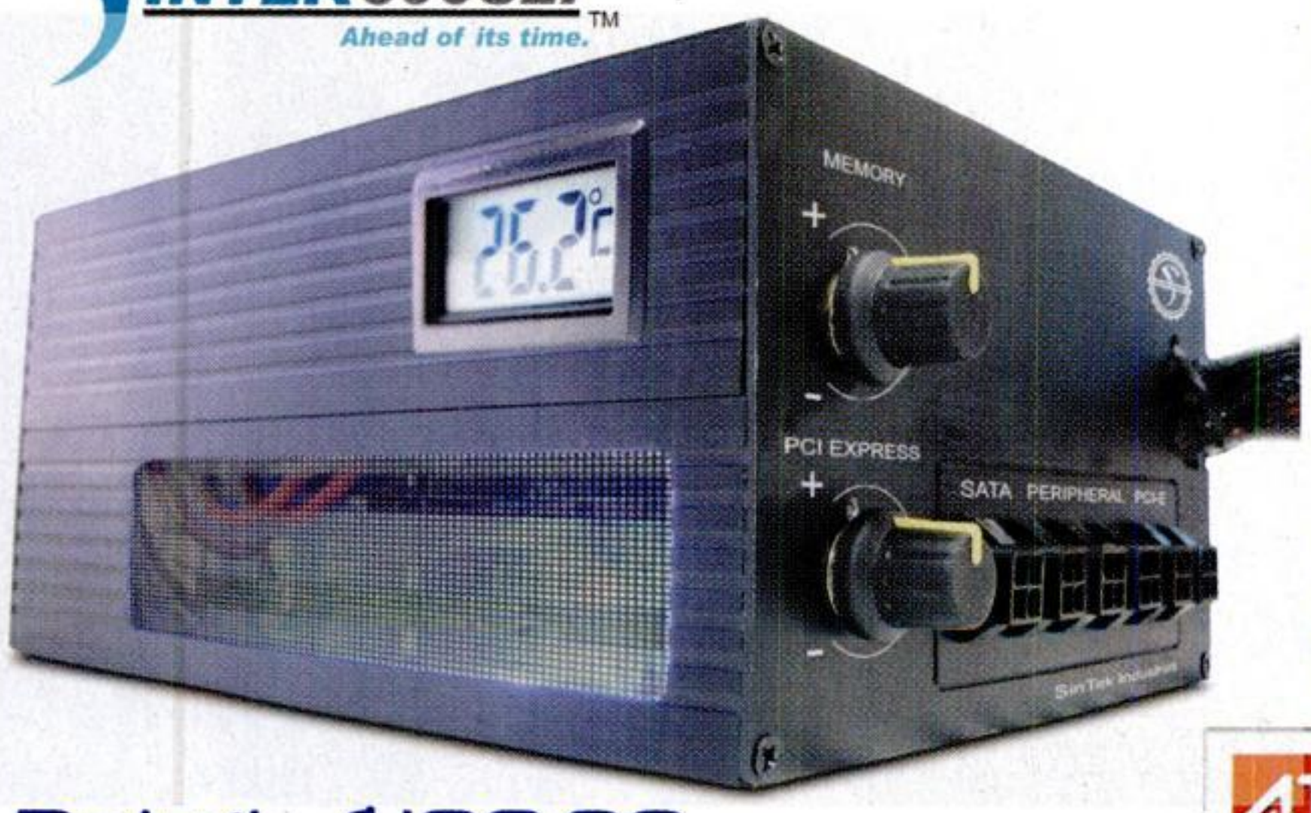

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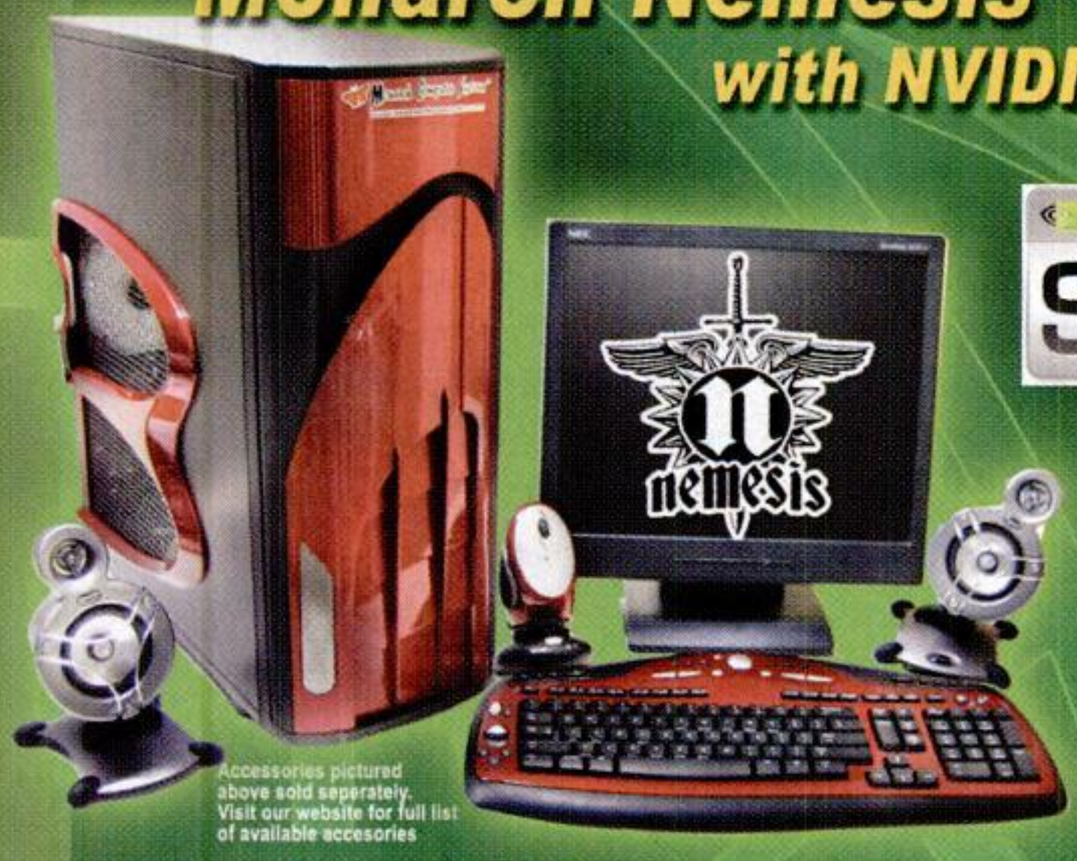

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Corsair (VS1GBKIT333)
Western Digital 80GB SATA 8MB Cache
7200 RPM (WD800JD)
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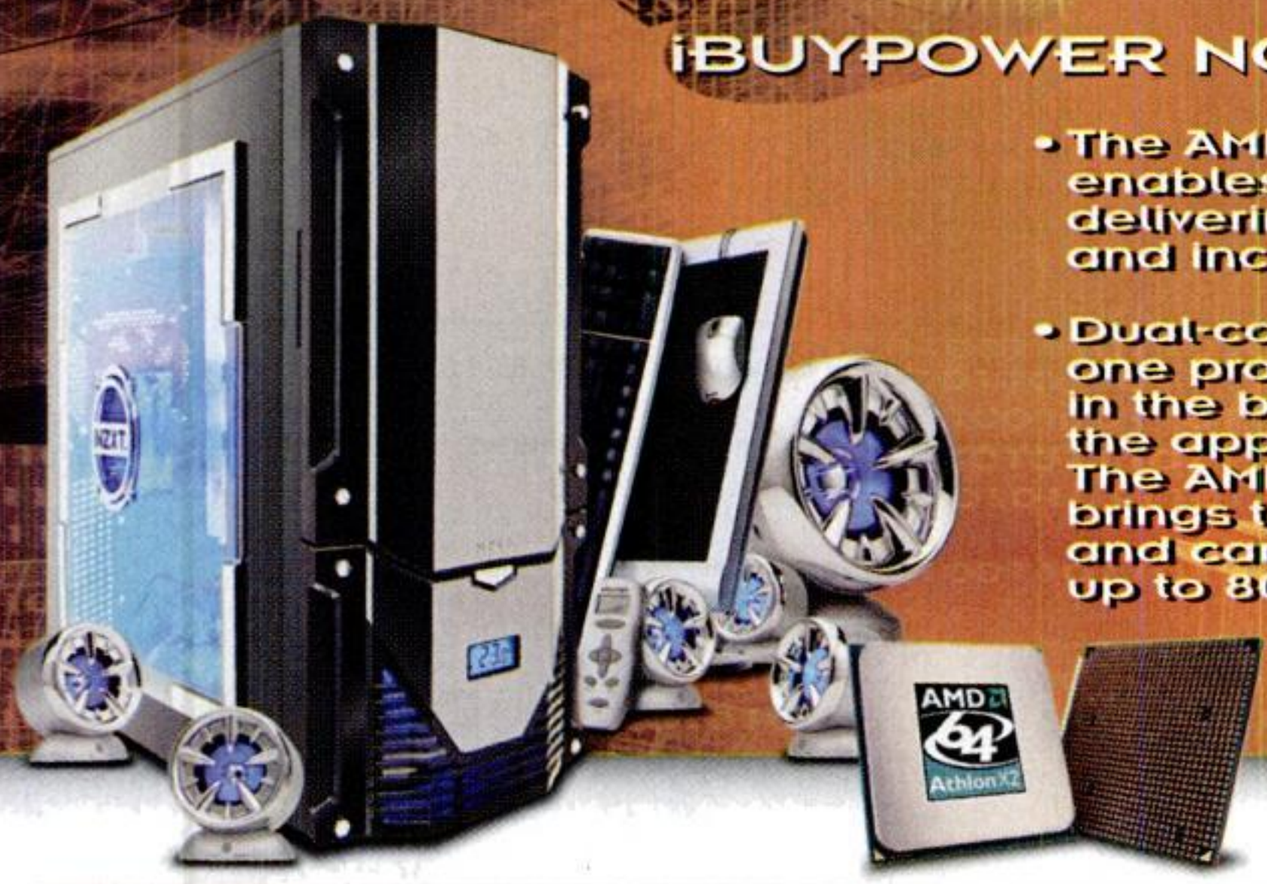

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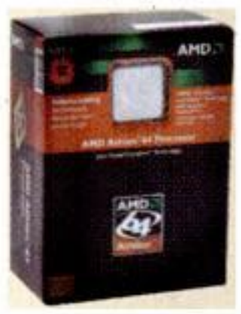

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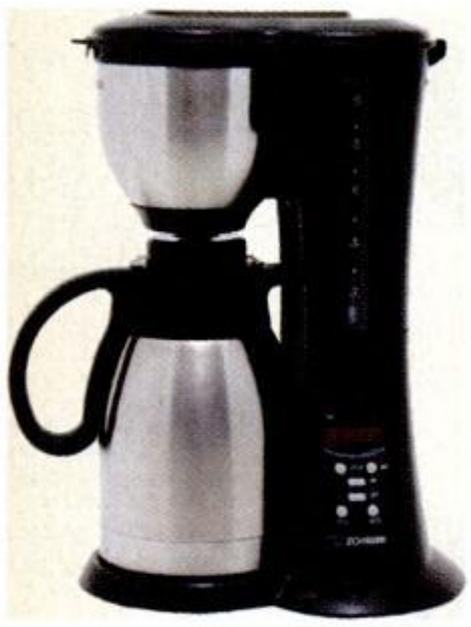

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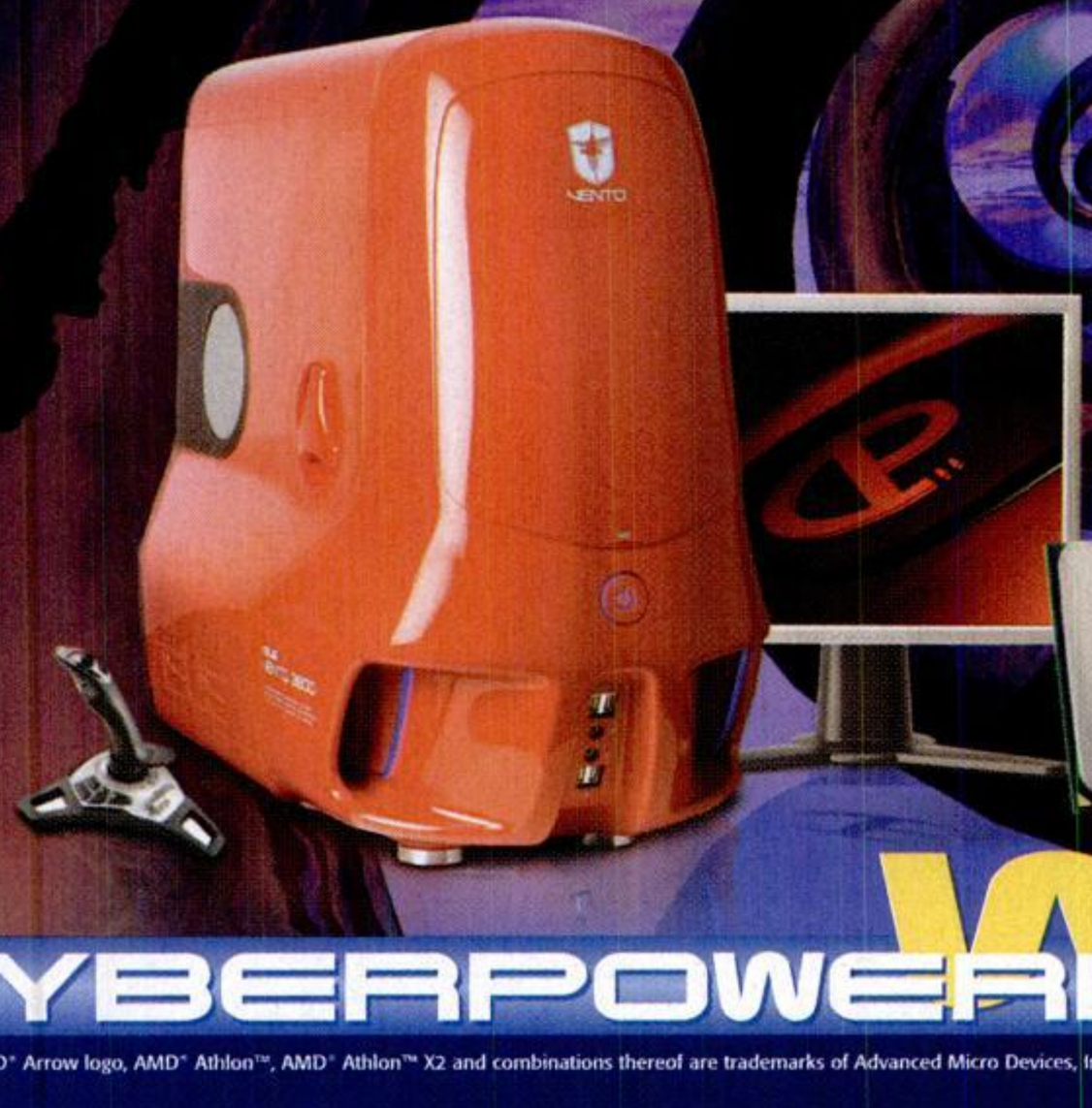

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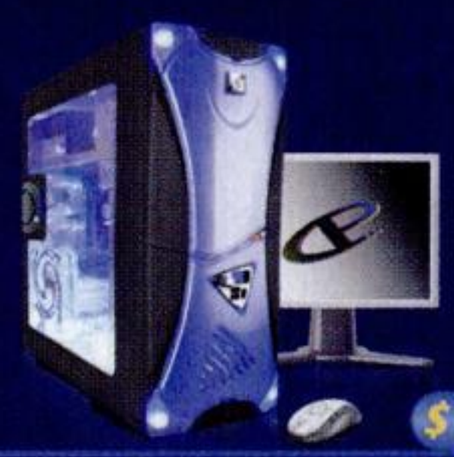

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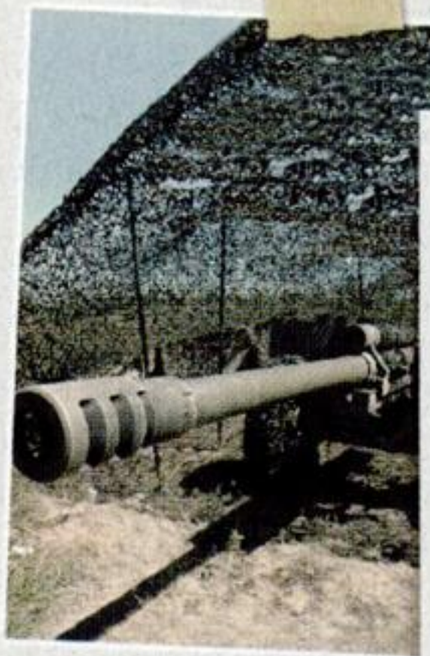

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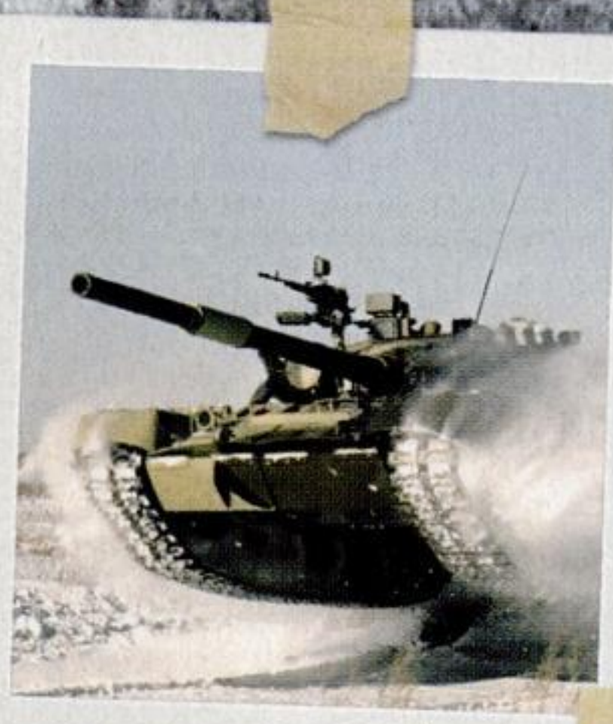

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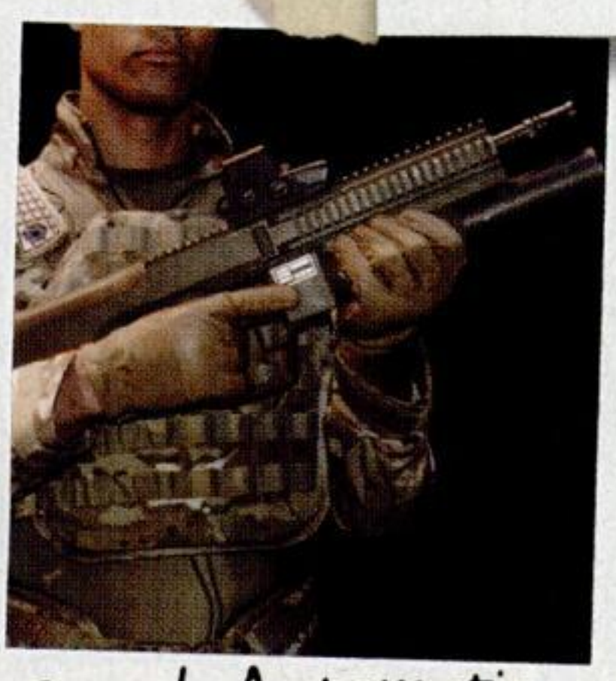

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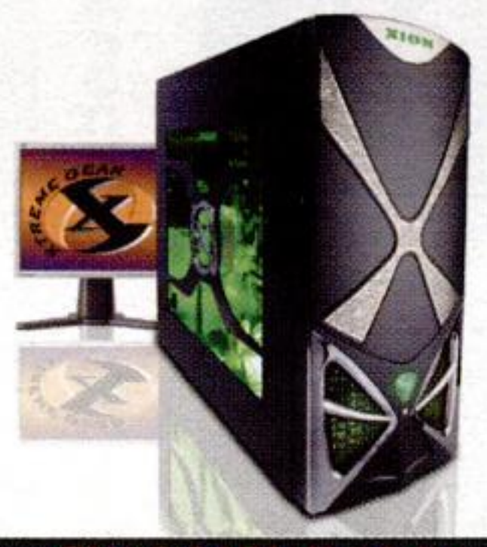

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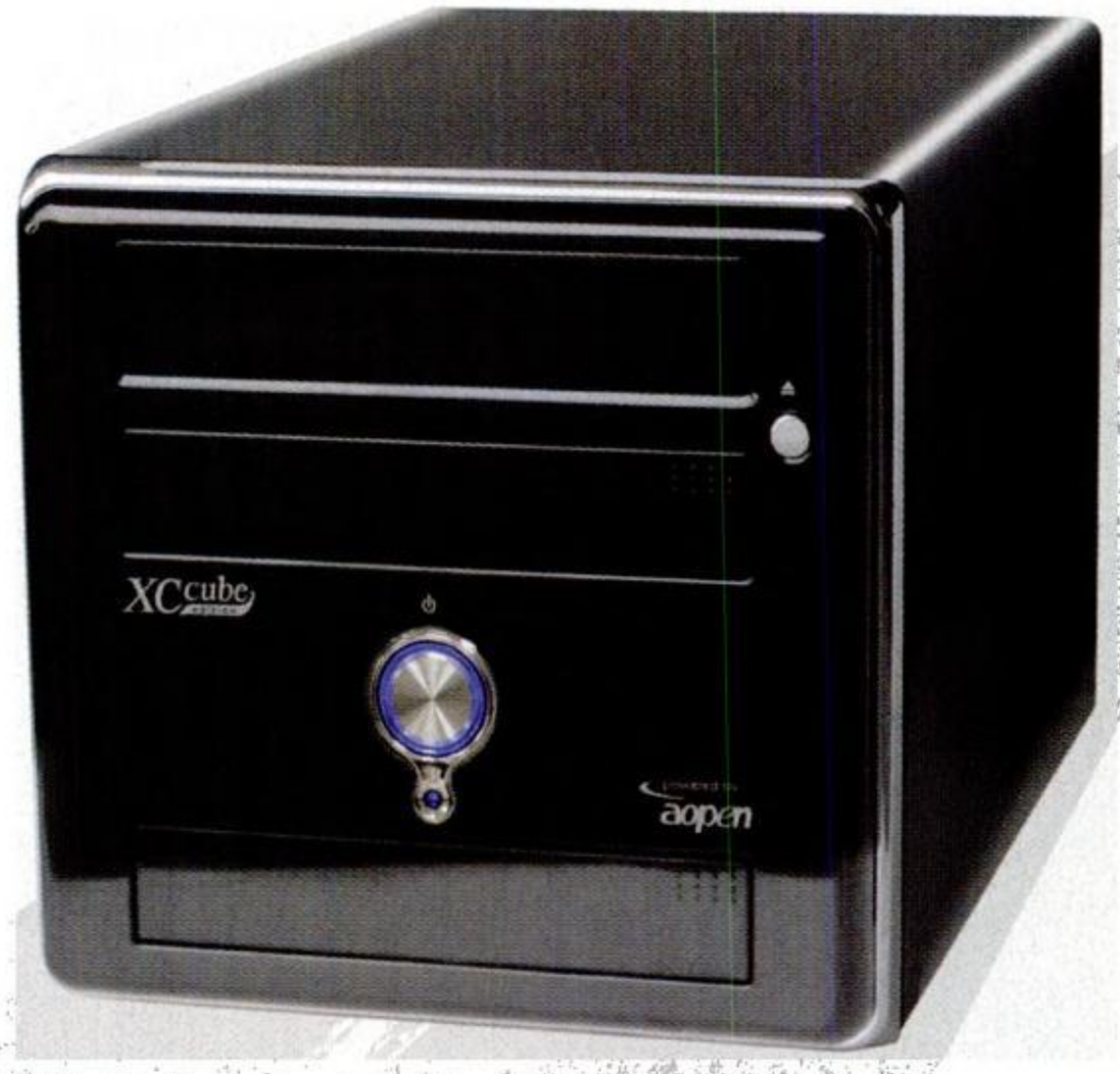

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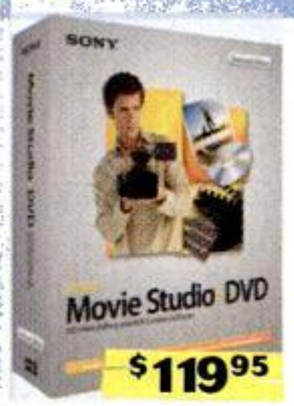

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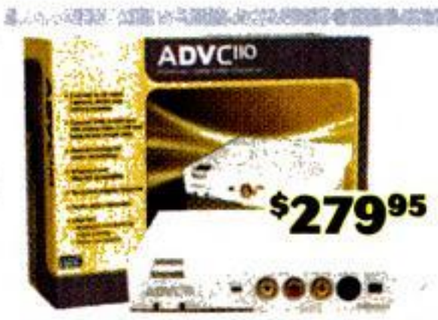

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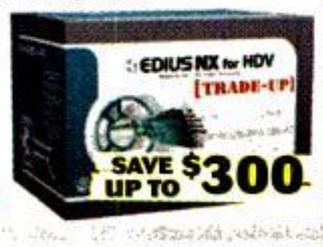

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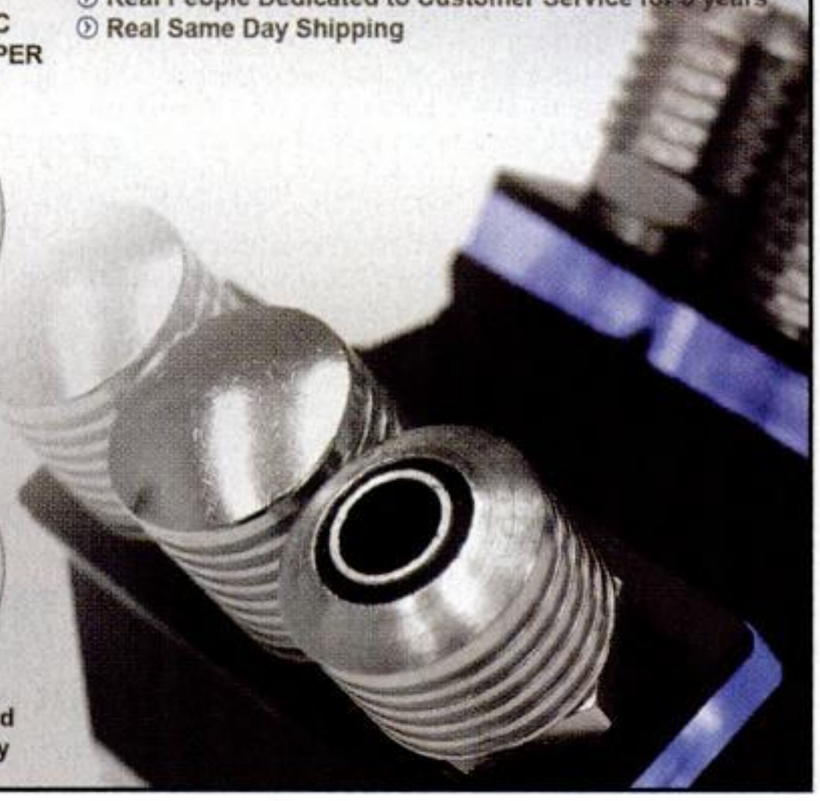

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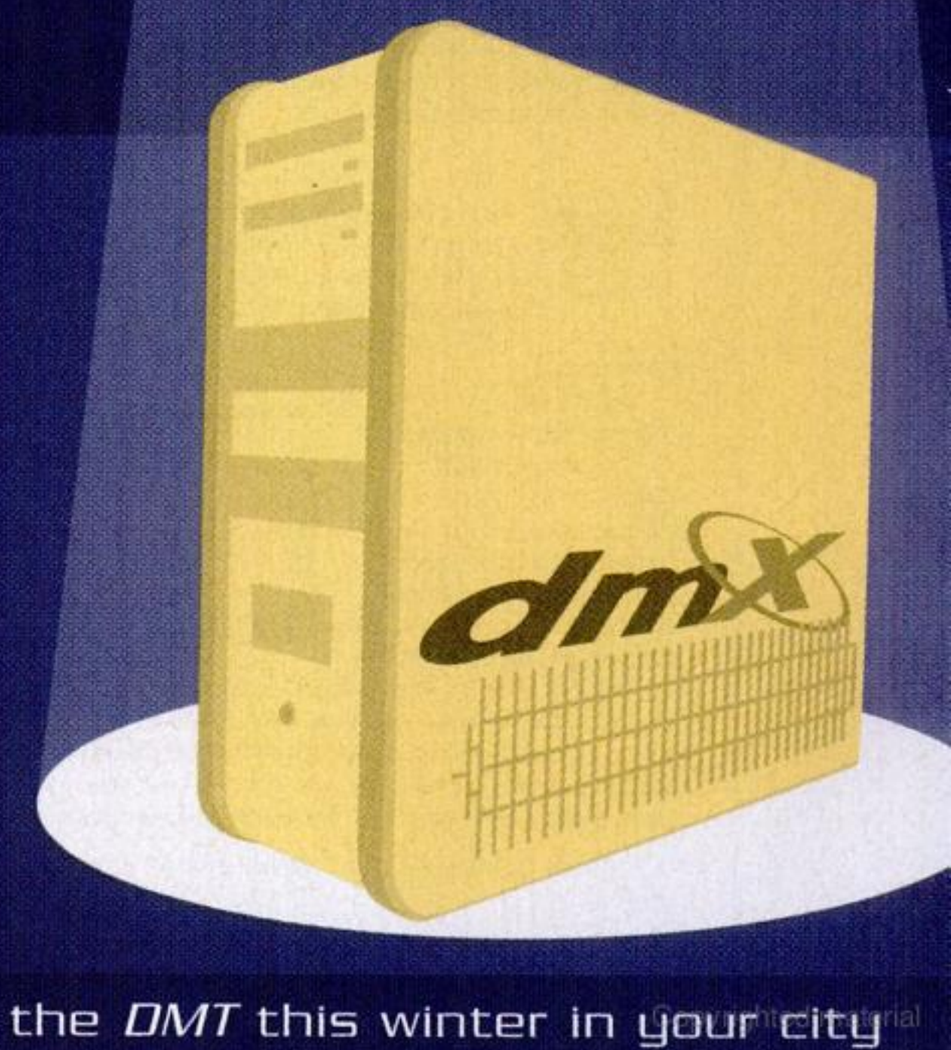

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tom's hardware
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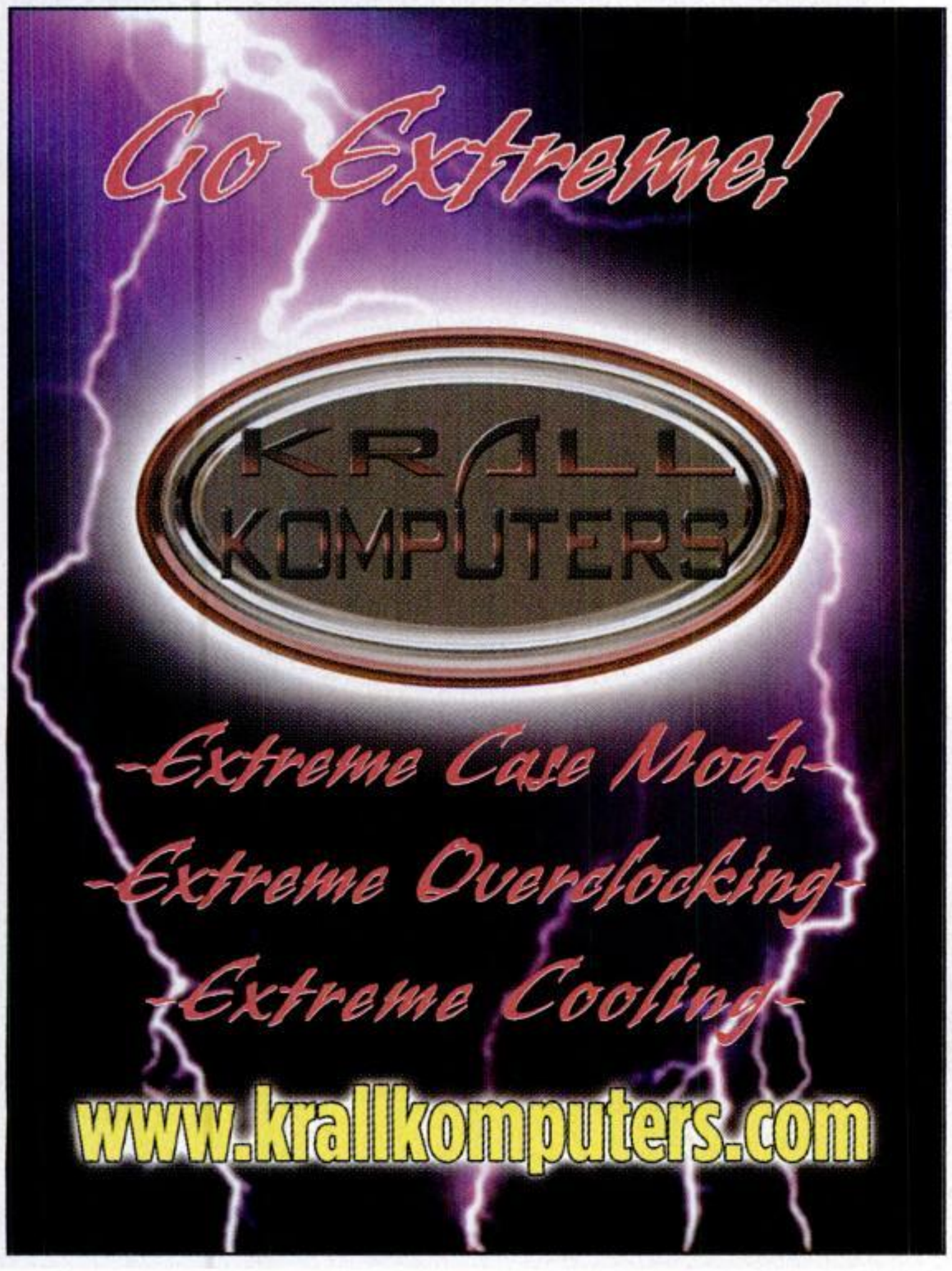

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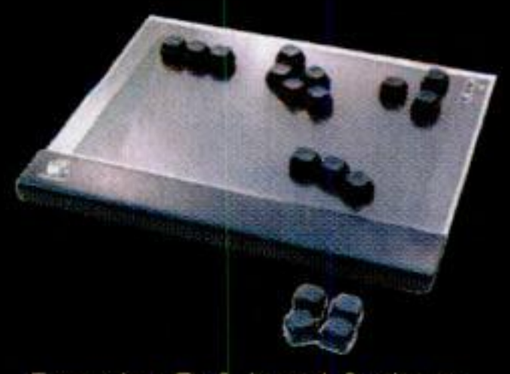
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We tackle tough reader letters on...

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LIVING THE COOL DREAM

After reading the Dream Machine story in September, I was curious what kind of cooling you used in DMX?

Also, concerning the OS: I have too much software to even consider repurchasing everything when I upgrade to the 64-bit version of Windows XP Pro. Can you comment on the DMX performance with Windows 2000 Pro?

—Larry Voyer

ASSOCIATE EDITOR JOSH NOREM RESPONDS:
Though it's normal and even expected that an audacious PC will have an elaborate cooling setup, we deviated from this practice and used a very basic air-cooling setup for DMX, for two reasons. First, the primary advantage of a water-cooling setup is that it allows you to achieve much better overclocking results than are possible with air-cooling, given the lower CPU temperatures. DMX's workstation motherboard negated the option of overclocking. Second, we actually considered a water-cooling setup just for giggles, but with all the hardware in the rig, there wasn't enough room inside the case to mount a radiator/fan, pump, reservoir, and all the tubing.

The CPU heatsink we used is a reference cooler for the FX-55 processor made by AVC (www.avc.com.tw). It uses a copper base plate, aluminum fins, and four copper heat pipes. We use this same heatsink/fan in our zero-point test beds as well.

As for 64-bit Windows, your existing 32-bit software should work on the new 64-bit OS, so there's likely no need to repurchase your apps. If you're going to run a machine with 8GB of RAM, you need XP x64, otherwise the OS (and applications running on it) won't see more than 3GB or so of your memory. That would make the other 5GB of RAM case warmers. We haven't run Windows 2000 in the Lab in years, so we can't really comment on it.

WAS IT REALLY DUAL EVERYTHING?

I'm disappointed you missed one particular "dual" option in Dream Machine '05.

I spend my lunch breaks figuring out what parts would fit nicely in my own custom-built desktop rig. About six weeks ago, I noticed two new DVD drives: Lite On's SOHW-1693S (internal IDE) and 1693SX (external USB,) both sporting dual-layer support for both the + and – recordable DVD formats. Why didn't you include dual-format, dual-layer burners in the Dream Machine?

—Darryn O. Stevens

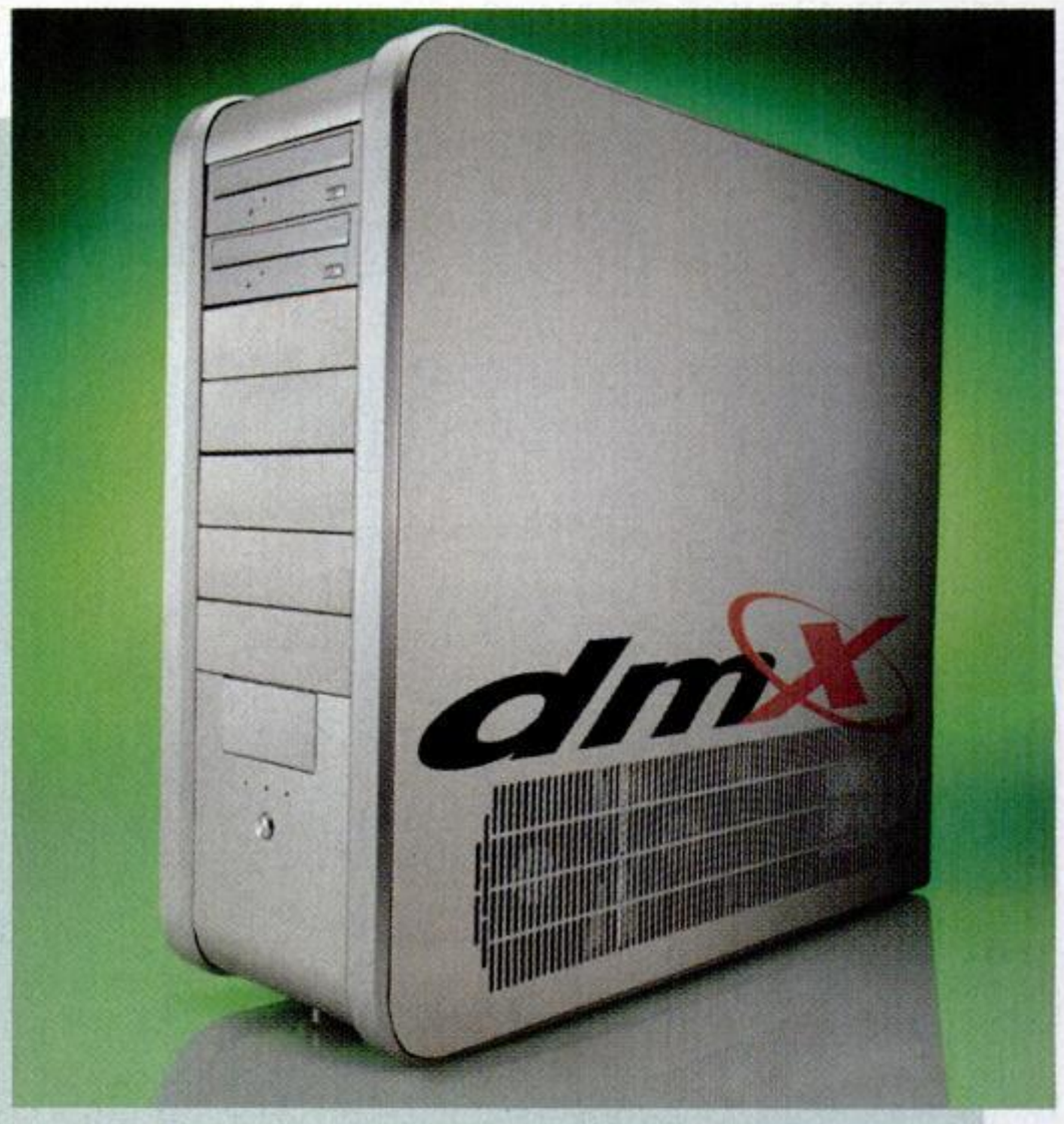
FEATURES EDITOR LOGAN DECKER RESPONDS:
Sometimes manufacturers let their drives hit store shelves without giving reviewers a first look. Most of the time, this is not good news (there was a reason, after all, Hollywood didn't allow film critics to see *Catwoman* before it opened in theaters). But this time, we suspect it had more to do with the lack of media available at launch time, in addition to the general malaise regarding yet another recordable DVD format.

Now that DVD-R double-layer media is available (at 4x, no less), we're bringing in drives that support the format to see how it performs. But we wouldn't get too excited about it—drives like Plextor's PX-716A are capable of overspeeding DVD+R DL media to 6x (that is, writing in excess of the media's rated speed), and until we see a

Dreaming of Linux

In the September issue, your "5 Ideas Microsoft Should Steal" story noted five major problems with Windows, yet the Dream Machine had two versions of Windows, but no Linux. You definitely have enough hard drive capacity to include an alternative OS, why didn't you?

—Ryan Nisly



EDITOR IN CHIEF WILL SMITH RESPONDS:
Because we don't really have a testing procedure or reference benchmarks set up for Linux machines, we didn't see any reason to expend time or effort getting Linux to work on DMX. That said, there's no reason DMX wouldn't run any of the major Linux distros. Our Netcell RAID card works with most Linux distros without needing any drivers (getting hardware RAID to work is commonly a coming-of-age ordeal for Linux users), and GeForce 7800 boards are supported with the latest nVidia Linux driver.

CUTCOPYPASTE

On page 69 of the September issue, we inadvertently ran the wrong URL for the Monarch Nemesis system. The correct URL is www.monarchcomputer.com.

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drive capable of doing the same thing with DVD-R, all we can say is "eh."

We haven't heard of anyone who's working on or even backing the idea of a double-layer rewriteable disc. Not only does it add another format to an already brutally long list, but it's almost certain that double-layer rewriteable DVDs would have extremely poor compatibility with set-top devices, if they had any at all. We suspect the confusion comes from press releases announcing upcoming "double-layer rewriteable DVD drives," which mean they're capable of writing to write-once double-layer discs as well as to single-layer rewriteables.

APPLE AND INTEL SITTING IN A TREE

After reading "Apple's x86 Invasion" (Release Notes, August 2005), I'm super excited. Apple's move to the x86 architecture gives us what power users have always wanted: a viable OS choice. Sure, Linux is an option, but the average computer user is never going to give up the simplicity of Windows for the Penguin. OS X will give us all the power of Unix wrapped in an innovative, proven shell.

I'll happily pay a premium for Apple's incredible hardware and software design to have one machine that lets me boot into Windows XP for my ***Battlefield 2*** *or* ***City of Heroes*** *sessions, and then live in OS X for everything else.*

I'm glad Apple is finally getting the attention it deserves. If nothing else, the gains Apple is making should at least prompt Microsoft to start addressing some of its problems. Apple does it better—always has. I think the Intel move will allow more people to realize exactly that.

—Ken Higginson

SET KONFABULATOR FREE!

*Not sure if you guys know, but the best program ever created (**Konfabulator**) is now free because the company was bought by Yahoo. If that weren't enough, anyone who bought the 2.0 version is getting a full refund! That's what happens when the best program gets better.*

~Benjamin Budzak

UPGRADE-THIS

I must say that I am impressed with nVidia's new GeForce 7800 series. But I'm not impressed with this GPU's ability to produce high dynamic range lighting, or its new programmable shaders. No, what amazes me is nVidia's ability to shove out a new card that no one needs. These $600 cards create nothing but shinier water, more shadows, and useless artifacts in games that hardly utilize the ***existing*** *hardware's full capabilities. When will we stop being impressed by an extra ripple on a puddle splash, or a wrinkle in someone's face in exchange for a $100 jump in the price of videocards?*

—Joe Amato

WHERE'S <INSERT MY FAVORITE UTILITY HERE>?

I was disappointed you didn't include Eset's ***NOD32 Antivirus*** *software in your August "23 Computer Cures" feature (August 2005). I've had great luck with* ***NOD32*** *finding viruses that other antivirus apps miss.* ***NOD32*** *also uses fewer resources, which is a big plus for gamers.*

I was also surprised you didn't include Microsoft's ***AntiSpyware*** *application. While it's still beta software, it's very stable and finds tons of spyware on computers I use it on.*

—Kevin Allen

I recently browsed through your "23 Computer Cures" article in the August issue. I was quite surprised to notice that you did not include a review of the free version of ***AVG Antivirus*** *in either the antivirus or freeware section.*

What gives? In the past, you gave this software a Softy Award and now you're not even reviewing it.

—Mark Harrer

EDITOR IN CHIEF WILL SMITH RESPONDS: One consequence of running a big utility roundup is that everyone writes in afterwards to tell us about the great utilities we left out. While we've used *NOD32* before, we didn't realize it was as popular as it seems to be from the number of emails we've received about it. We'll definitely take a closer look at it at some point in the future.

Microsoft's *AntiSpyware* is a valuable tool, but it's still beta (the version currently posted on Microsoft's website expires at the end of the year). Furthermore, it won't install when you boot into Safe Mode, while *Spybot* does. We like Microsoft's *AntiSpyware* app, but it's more of a supplement to your other spyware apps than a replacement for them.

As for *AVG*, the fact that Grisoft has buried the freebie version so deep on its site that the only way to find it is to use a search function, and given the newly restrictive terms of the license (you can't use it in a networked environment), we bumped it off of our list. MPC

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COMING NEXT MONTH IN MAXIMUM PC'S

WHAT-HAPPENS-IN-THE-LAB-STAYS-IN-THE-LAB

NOVEMBER ISSUE

VIDEOCARD BUYERS GUIDE

Confused? Bewildered? Vexed? No problem—*Maximum PC* has the answers on choosing your next videocard for today's and tomorrow's games! We break down the specs, put the jargon in laygamer's terms, and show you exactly what to expect from high-end setups like SLI or CrossFire. Plus, a massive videocard review roundup!

USING WINDOWS MOVIE MAKER 2

If you've been nervous about getting your feet wet with video editing, now you've got no reason to avoid it: We walk you through making a complete movie out of your footage, using software you already have right there in Windows XP!

PLUS: A SURPRISE BIRTHDAY PARTY!

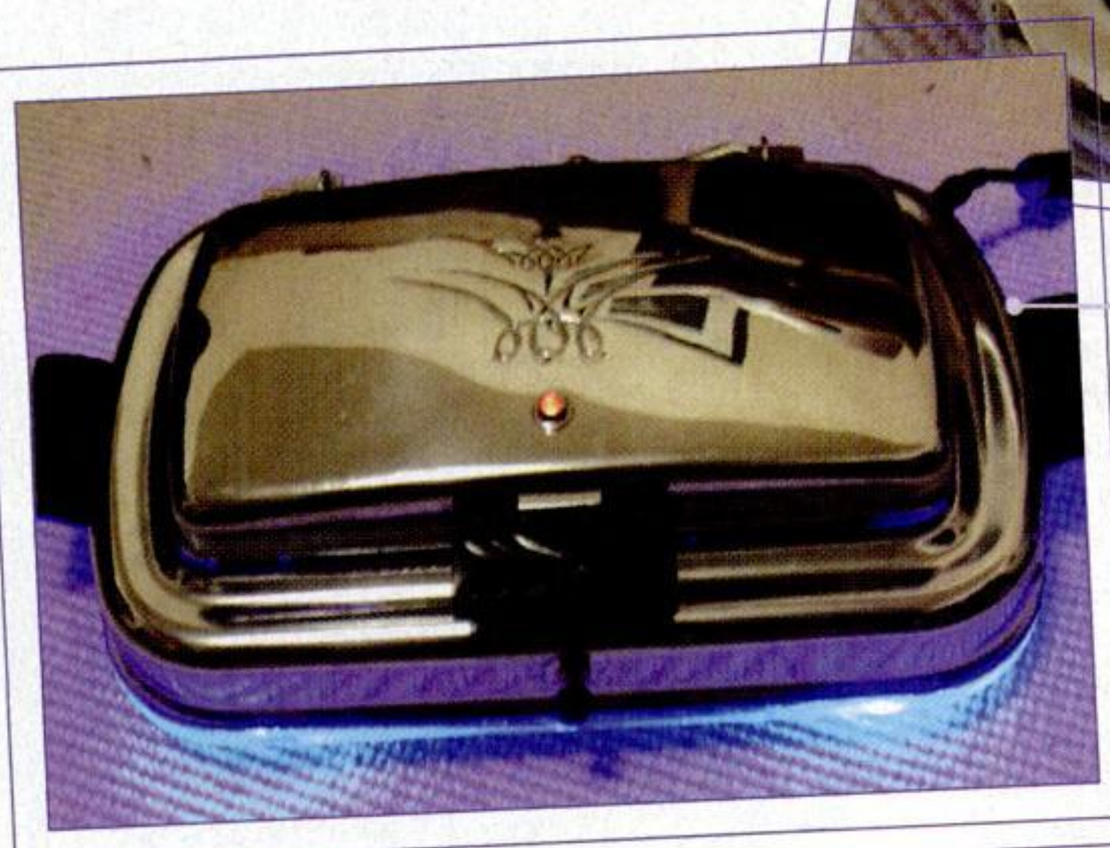
It's been 20 years since the birth of a near and dear friend! We'll peer through the mists of time, and toast and roast someone we all know and love.

PHILIP NERGES'

Waffle Iron PC

It's not that Philip Nerges is a huge fan of waffles—to be honest, we don't know *where* he stands on the breakfast treat—his mod was primarily inspired by an appreciation for vintage appliances. Originally, he wanted an old TV or stereo to house his rig, but unable to find one that was broken ("I won't break a piece of working history," he says), Nerges settled on an inoperative waffle iron—which clearly works just fine as a PC enclosure.

Nerges had to replace the bottom with a sheet of acrylic, which he dropped a bit to make extra room for the parts. In the end he had the 8x12x4-inch iron packed with the makings of his MP3 file server. It's a tight squeeze, for sure, but when the lid is closed, the parts still get plenty of air, thanks to clear grommets on the inner acrylic enclosure that keep the lid 1/4-inch aloft.



In its day, that red light on the iron's lid meant waffles were cooking. Now it serves as the power indicator for the PC. The power button sits below it, on the iron's bottom half, and a toggle switch underneath the machine turns the blue LED lights in the feet on and off.

EL wire running through the iron's original heating coil makes the inside of the lid look like it's glowing with heat—just daring you to pour down some batter.

Things are kept nice and tidy in the back, thanks to that silver tube on the left side. It once protected the conduit for the heating coil; now it keeps the wires for the lighting out of sight.

SPECS

MOBO	Epia Mini-ITX with built-in sound and graphics chipsets
CPU	VIA m1000
HARD DRIVE	Maxtor ATA133 160GB
RAM	512MB of DDR 266
OS	Linux

If you have a contender for Rig of the Month, e-mail **rig@maximumpc.com** with high-res digital pics and a 300-word write-up.

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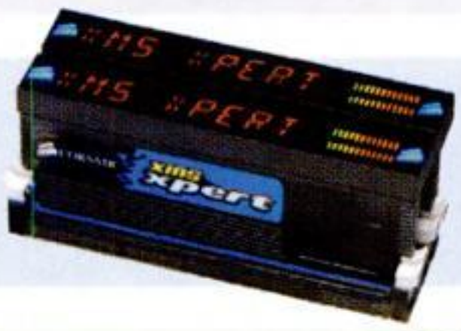

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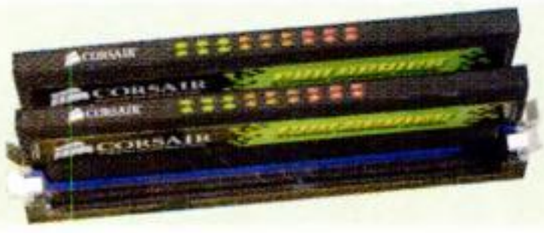

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